

Teacher Resource

to

[TOOLS-FAST] WORKSHOP



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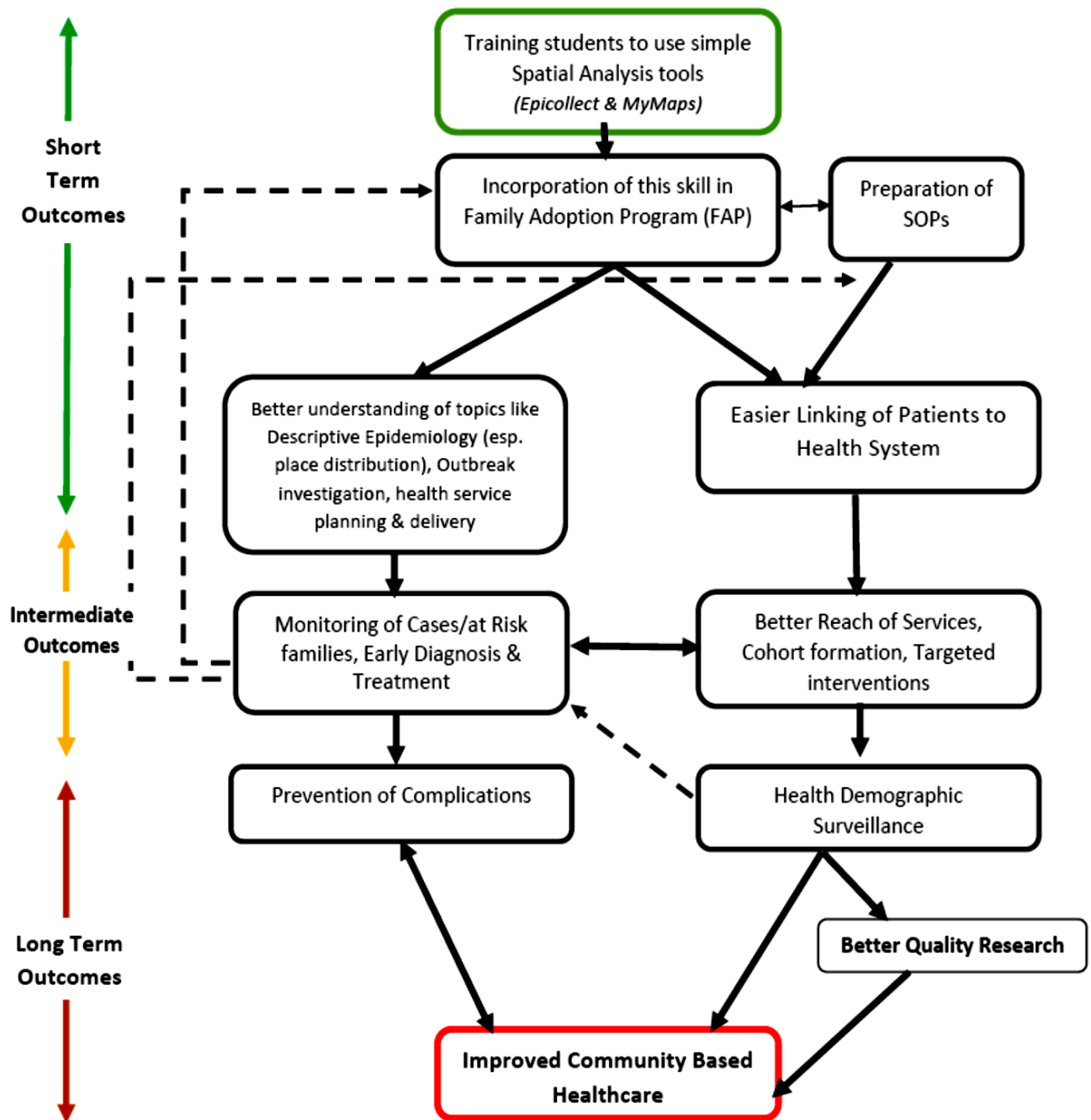
What is TOOLS FAST?

TOOLS FAST stands for TOOLS for Family Adoption and Survey Training. Full title of the research being **Teaching Utilization of Spatial Analysis Tools while conducting Family Adoption and Survey Training.**

It is instituted by Dr. Mandar Baviskar of Pravara Institute of Medical Sciences (Deemed University) with an objective to train undergraduate students to understand descriptive epidemiological concepts (especially spatial distribution) better while conducting Family Surveys. Additionally, the project will also facilitate longitudinal follow up of families as envisioned by National Medical Council.

This Curriculum Innovation Project is a part of Advanced Course in Medical Education (ACME 2023B) at Seth GS Medical College, KEM Hospital, Mumbai. Currently, the project utilizes Epicollect 5 and Google MyMaps. It will be extended to include other tools that improve competencies.

Concept Map



Gagne's Nine Step Model of Instruction was followed while designing and conduct of the Workshop

1. Gain attention of the students:
 - Ice breaking Session: Belongingness Scenario: Geographic Determinants of health (PuLa Deshpande Mumbai, Pune and Nagpur)
2. Inform students of the objectives:
 - Objectives explained
3. Stimulate recall of prior learning:
 - Descriptive Epidemiology,
 - John Snow,
 - Time Place Person Distribution,
4. Present the content:
 - **Spatial Analysis:** What is it?, GIS data, File Types, GeoTagging, Data Entry and Analysis, Sample Uses
 - **Epicollect 5:** Installation, Features Overview, Sample Form Creation, Data entry using Android app, Table view/Map view, Exporting data file, Data Privacy Settings
 - **Google My Maps:** Features, Demonstration Importing data file, Demonstration Data Visualization in various modes.
5. Provide learning guidance:
 - Creation of Data Forms in Epicollect 5 by students,
 - Sample Data Analysis & Visualization in Epicollect 5 and Google My Maps.
6. Elicit performance (practice):
 - Community based Survey Assignment
7. Provide feedback:
 - Feedback Provided after Survey Report Submission
8. Assess performance:
 - Grading Reports according to Wu Framework
9. Enhance retention and transfer to the job:
 - What's App Discussion Group,
 - Family Adoption Program (Planned)
 - Projects & Electives (Planned)

Workshop Timetable

Sr No	Topic	Time
1	Registration, General Instructions and Pre Test	9:00 AM to 9: 15 AM
2	Gain attention of the students: Ice breaking Session: Belongingness Scenario: Geographic Determinants of health (PuLa Deshpande: Mumbai, Pune and Nagpur)	9:15 AM to 9:45 AM
3	Inform students of the objectives: Objectives explained	9:45 AM to 10:00 AM
4	Stimulate recall of prior learning: - Descriptive Epidemiology - John Snow & London Cholera Epidemic - Time, Place, Person Distribution	10:00 AM to 11:00 AM
5	Present the content: Spatial Analysis: What is it?, GIS data, File Types, GeoTagging, Data Entry and Analysis, Current Applications Epicollect 5: Installation, Features Overview, Sample Form Creation, Data entry using Android app, Table view/Map view, Exporting data file, Data Privacy Settings Google My Maps: Features, Demonstration Importing data file, Demonstration Data Visualization in various modes.	11:00 AM to 1:00 PM
6	Provide learning guidance: Creation of Data Forms in Epicollect 5 by students, Sample Data Analysis & Visualization in Epicollect 5 and Google My Maps.	
7	Post Test	1:00 PM to 1:15 PM
LUNCH BREAK		1:15 PM to 2:00 PM
8	Field Visit Elicit performance (practice):Community based Survey Assignment	2:00 PM to 4:30 PM
9	Get & Provide Feedback	4:30 PM to 5:00 PM
10	Assess performance: Grading Reports according to Wu Framework	Post Workshop
11	Enhance retention and transfer to the job: - What's App Discussion Group - Family Adoption Program (Planned) - Projects & Electives (Planned)	

Sample Attendance Sheet

ATTENDANCE SHEET

SR NO	NAME OF STUDENT	LECTURE DEMONSTRATION	FIELD VISIT
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Sample Instructions to Students

WORKSHOP ON EPICOLLECT AND GOOGLE MY MAPS

General Instruction to Students

1. All students are instructed to bring their Smartphone and Laptop/Tab/iPad for the workshop.
2. Students must ensure that their devices are fully charged and connected to internet/ college wifi
3. Students must be seated in the Demo Hall, Community Medicine 10 min. before the Workshop Begins
4. All students must sign the attendance sheet circulated twice. Once during the Demonstration session and Second time after completion of field visit.
5. All students are instructed to fill Pre and Post Test Forms and Submit them on time
6. All students are instructed to fill Feedback form at the end of Workshop and submit to the co-ordinator.
7. While going for field visit the students will wear Aprons and carry smartphones with them.
8. Only those students who submit the final assignment on time will be awarded certificates.
9. Students are encouraged to practice with the applications on their own and share any projects that they have built themselves.
10. Students are encouraged to write reflections about the workshop in their Community Medicine Logbook and get it signed by co-ordinator.
11. Students can share photographs from field visit or send a small video feedback about the workshop in form of a reel what's app group.
12. Students WILL NOT share any questions from pre and post test or feedback form with their batchmates

Sample Feedback Form

1. Was the workshop helpful in improving your understanding of Spatial Analysis?
 - a) Not helpful
 - b) Somewhat helpful
 - c) Very helpful
2. How confident are you of designing a data collection form in Epicollect?
 - a) Not confident
 - b) Somewhat Confident
 - c) Very Confident
3. How confident are you of collecting relevant data in the community?
 - a) Not confident
 - b) Somewhat Confident
 - c) Very Confident
4. How confident are you of *Geotagging* using Epicollect?
 - a) Not confident
 - b) Somewhat Confident
 - c) Very Confident
5. How confident are you of linking the data file with *MyMaps* and selecting relevant data spread?
 - a) Not confident
 - b) Somewhat Confident
 - c) Very Confident
6. What did you like best about the training?
7. What do you feel can be done better?

Sample Pre-Test/ Post-Test

1. Descriptive Epidemiology involves
 - a. Seeing how patients respond to Behaviour change before and after intervention
 - b. Assessing effectiveness of a drug
 - c. Time, Place and Person Distribution of Condition under study
 - d. Establishing cause and effect relationship
2. Spot Map was used by John Snow for?
 - a. Plotting the cases of London Cholera Epidemic
 - b. Plotting the hand pumps in London
 - c. Plotting the water supply in London
 - d. Plotting the elevation of London houses
3. What is line listing in Outbreak Investigations?
 - a. Outlining the area affected by disease
 - b. Preparing a spot map of cases
 - c. Enumerating details of all affected people in an area
 - d. Identifying the source of cases
4. Which of the following is NOT a File extension for a Vector Spatial Analysis file
 - a. .kml
 - b. .json
 - c. .bmp
 - d. .gml
5. GIS represents a location in _____ dimensional coordinates.
 - a) 2
 - b) 4
 - c) 6
 - d) 8
6. Map types in Google MyMaps all except
 - a) Political
 - b) Terrain
 - c) Whitewater
 - d) Darknight
7. Android Epicollect 5 version allows all except
 - a) Geotagging data
 - b) Barcode reading
 - c) Attaching Photographs to data
 - d) Editing data form
8. The longitude and latitude values in Epicollect form can be added upto how many decimal places
 - a) 4
 - b) 5
 - c) 6
 - d) 8
9. Sister forms in Epicollect 5 can be linked using which form tool
 - a) Branch
 - b) Copy
 - c) Dropdown
 - d) Group
10. Which option allows a questionnaire to follow a conditional flow based on the user's answers
 - a) Link
 - b) Group
 - c) Jump
 - d) Dropdown

Sample Assignments

1. Map Households with Tobacco users in the allotted Field Practice area. Classify according to Smokers/Chewers and Mishri users
2. Map Households with Hypertensive patients in the allotted Field Practice Area. Classify according to Controlled and Uncontrolled hypertension
3. Map Households with children under 5 years of age. Classify according to immunization completed and not completed till date.
4. Map Households according to health seeking from Private & Public Hospitals

Sample Assignment Report

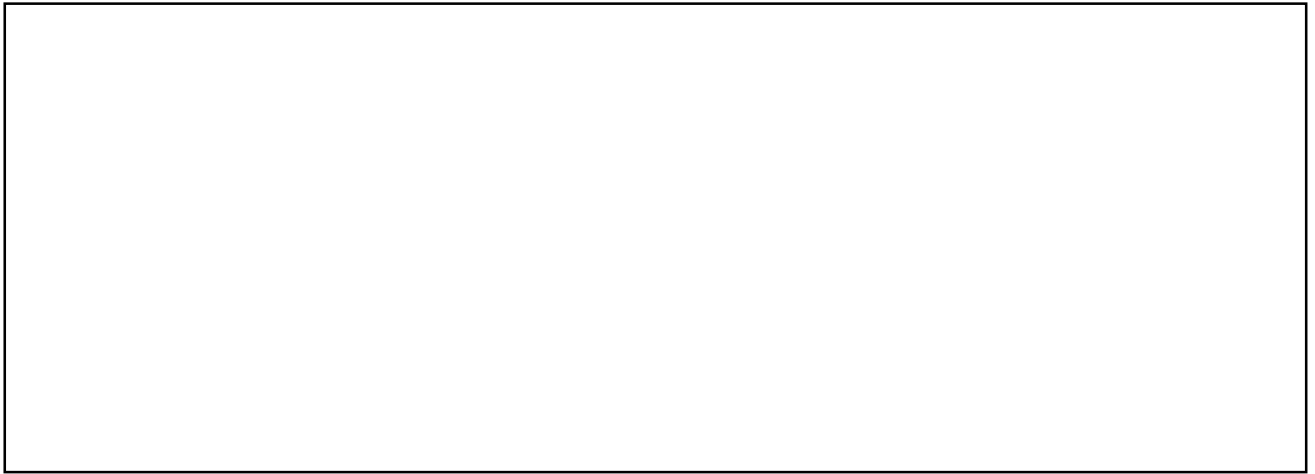
Workshop: 1/ 2/ 3/ 4

Date:

Area Surveyed:

Total Houses Surveyed:

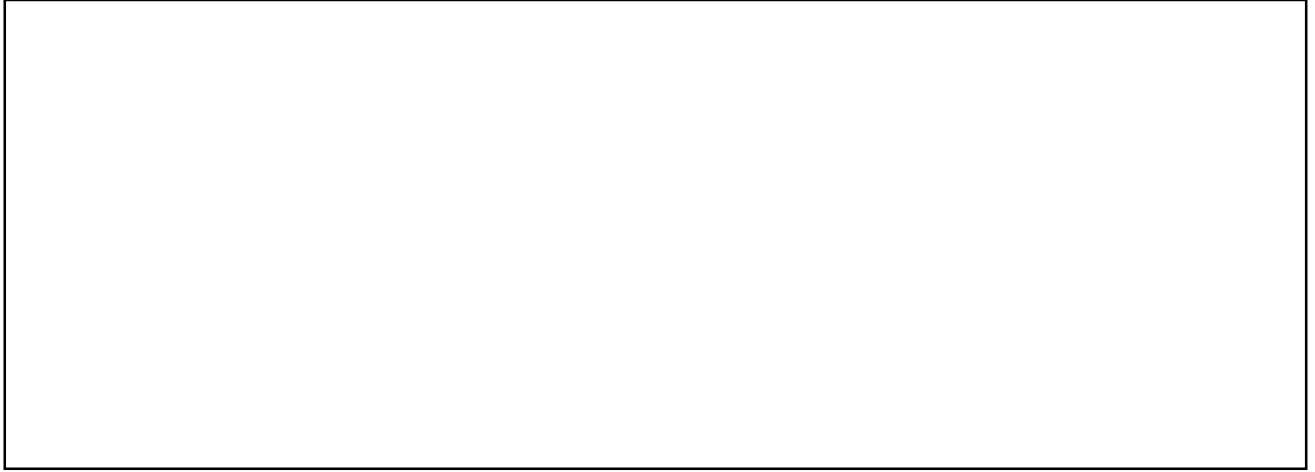
1. Number of Houses with Under 5 year olds:
Layer Complete & Partial Immunization



Map Screen Shot

Insights:

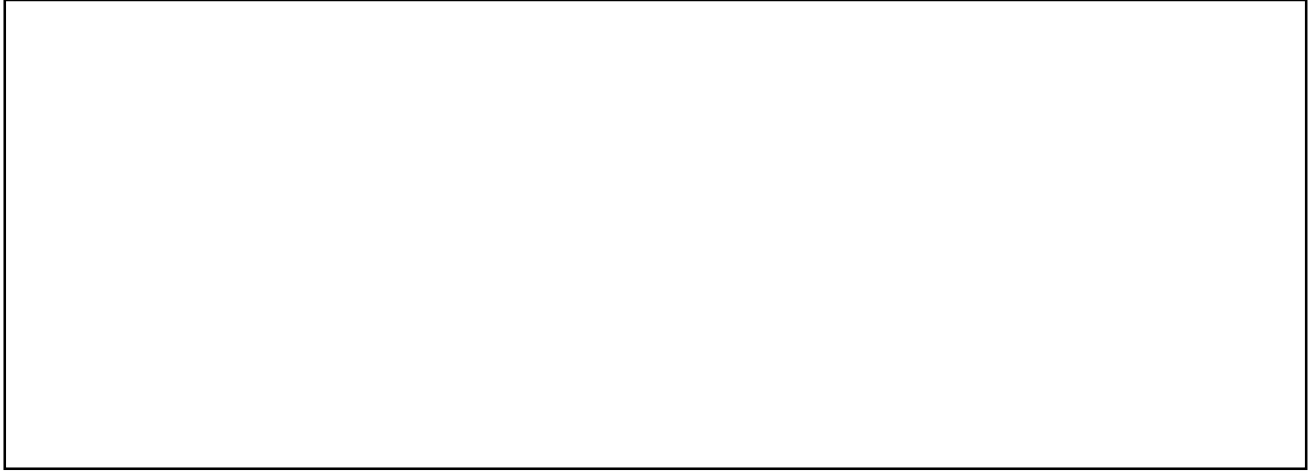
2. Number of Houses with Hypertensive Patients:
Layer those who seek treatment from Public & Private Hospitals



Map Screen Shot

Insights:

3. Number of Houses with Diabetic patients:
Layer those who seek treatment from Public & Private Hospitals



Map Screen Shot

Insights

Plan for follow up:

Condition	No. of Households	Houses Covered
Immunization IEC		
Blood Pressure Screening		
BSL Screening		

Sample Assignment Grading Format

Sr No.	Criteria	Marks (out of 10)
1	Can students use their spatial knowledge to describe events that they are interested in?	
2	Do students choose words that contain spatial meanings to explain their findings?	
3	Students are motivated by the events?	
4	Students find any relationship between the events and the specific locations?	
5	Students link what they have observed to the appropriate intervention in follow up visit if needed?	
	Total Score (out of 50)	

Bing Sheng WU Developing an Evaluation Framework of Spatial Understanding through GIS Analysis of Volunteered Geographic Information (VGI) Review of International Geographical Education Online ©RIGEO Volume 3, Number 2, Summer 2013.

Sample Data Map: Family Details

Question	Mapping To
Date of Visit	<i>1_Date_of_Visit</i>
Household ID	<i>2_Household_ID</i>
Name of the Head of Family	<i>3_Name_of_the_Head_o</i>
Location GeoTag	<i>4_Location_GeoTag</i>
Contact Number	<i>5_Contact_Number</i>
Family Type	<i>6_Family_Type</i>
Nuclear	<i>Nuclear</i>
Joint	<i>Joint</i>
Three Generation	<i>Three Generation</i>
Other	<i>Other</i>

Question		Mapping To
Number of Family Members		<i>7_Number_of_Family_M</i>
Religion		<i>8_Religion</i>
	Hindu	<i>Hindu</i>
	Muslim	<i>Muslim</i>
	Jain	<i>Jain</i>
	Buddhist	<i>Buddhist</i>
	Christian	<i>Christian</i>
	Sikh	<i>Sikh</i>
	Other	<i>Other</i>
Category		<i>9_Category</i>
	Open	<i>Open</i>
	OBC	<i>OBC</i>
	SC	<i>SC</i>
	ST	<i>ST</i>
	SBC	<i>SBC</i>
Socioeconomic Status(BG Prasad)		<i>10_Socioeconomic_Sta</i>
	Upper	<i>Upper</i>
	Upper Middle	<i>Upper Middle</i>
	Middle	<i>Middle</i>
	Lower Middle	<i>Lower Middle</i>
	Lower	<i>Lower</i>
Ration Card		<i>11_Ration_Card</i>
	Yellow	<i>Yellow</i>
	Orange	<i>Orange</i>
	White	<i>White</i>
	Card Unavailable	<i>Card Unavailable</i>
AADHAR Card		<i>12_AADHAR_Card</i>
	Yes	<i>Yes</i>
	No	<i>No</i>
ABHA Card		<i>13_ABHA_Card</i>
	Yes	<i>Yes</i>
	No	<i>No</i>

Dietary History		14_Dietary_History
Family Diet Type		15_Family_Diet_Type
	Vegetarian	Vegetarian
	Mixed	Mixed
Is anyone Suffering from Malnutrition?		16_Is_anyone_Sufferi
	Yes	Yes
	No	No
Average Monthly Expenditure on Food		17_Average_Monthly_E
Is Supplementary nutrition given to children & Pregnant or lactating women?		18_Is_Supplementary_
	Yes	Yes
	No	No
	Not Applicable	Not Applicable
Growth Monitoring To Be Done on Charts Provided		19_Growth_Monitoring
	Yes	Yes
	No	No
	Not Applicable	Not Applicable
Environmental History		20_Environmental_His
House		21_House
	Kaccha	Kaccha
	Pakka	Pakka
	Semi Pakka	Semi Pakka
Overcrowding		22_Overcrowding
	Yes	Yes
	No	No
Water Supply		23_Water_Supply
	Tap	Tap
	Borewell	Borewell
	Tanker	Tanker
	Other	Other
Water Purification Method		24_Water_Purificatio
	None	None
	Boiling	Boiling
	Chlorination	Chlorination
	Water Filter	Water Filter

Water Storage Container/Tank	25_Water_Storage_Con
------------------------------	----------------------

Covered	Covered
Non Covered	Non Covered

LPG Gas	26_LPG_Gas
---------	------------

Available	Available
Not Available	Not Available

Other Cooking Fuel Used, if any	27_Other_Cooking_Fue
---------------------------------	----------------------

Sanitary Laterine	28_Sanitary_Laterine
-------------------	----------------------

Not Available	Not Available
Private Toilet	Private Toilet
Public Toilet	Public Toilet

Garbage Disposal	29_Garbage_Disposal
------------------	---------------------

Doorstep	Doorstep
Common Point	Common Point
No System/ Throw out	No System/ Throw out

Mosquito Breeding Sites Noticed	30_Mosquito_Breeding
---------------------------------	----------------------

Yes	Yes
No	No

Family Member Details	31_Family_Member_Det
-----------------------	----------------------

Name	32_Name
------	---------

Age	33_Age
-----	--------

Sex	34_Sex
-----	--------

Male	Male
Female	Female

Education	35_Education
-----------	--------------

Not Applicable	Not Applicable
Illiterate	Illiterate
Primary	Primary
Secondary/Higher Secondary	Secondary/Higher Secondary
Graduate & Above	Graduate & Above

Occupation	36_Occupation
------------	---------------

	Not Applicable	<i>Not Applicable</i>
	Student	<i>Student</i>
	Homemaker	<i>Homemaker</i>
	Farmer	<i>Farmer</i>
	Labourer	<i>Labourer</i>
	Skilled Worker	<i>Skilled Worker</i>
	Professional	<i>Professional</i>
	Buisness	<i>Buisness</i>
	Unemployed	<i>Unemployed</i>
Marital Status		<i>37_Marital_Status</i>
	Married	<i>Married</i>
	Unmarried	<i>Unmarried</i>
	Divorced/Widowed/Seperated	<i>Divorced/Widowed/Seperated</i>
Diet		<i>38_Diet</i>
	Mixed	<i>Mixed</i>
	Vegetarian	<i>Vegetarian</i>
Calorie Intake		<i>39_Calorie_Intake</i>
	Normal	<i>Normal</i>
	Deficit	<i>Deficit</i>
	Excess	<i>Excess</i>
Any Significant Medical Condition		<i>40_Any_Significant_M</i>
	Anemia	<i>Anemia</i>
	Hypertension	<i>Hypertension</i>
	Diabetes mellitus	<i>Diabetes mellitus</i>
	IHD	<i>IHD</i>
	CKD	<i>CKD</i>
	TB	<i>TB</i>
	Malnutrition	<i>Malnutrition</i>
	Disability	<i>Disability</i>
Addictions		<i>41_Addictions</i>
	Alcohol	<i>Alcohol</i>
	Smoked Tobacco	<i>Smoked Tobacco</i>
	Smokeless Tobacco	<i>Smokeless Tobacco</i>
	Other	<i>Other</i>
Monthly Expenditure on Addiction		<i>42_Monthly_Expenditu</i>
Immunization for Age (if Child)		<i>43_Immunization_for_</i>

	Complete	<i>Complete</i>
	Partial	<i>Partial</i>
	Not Immunized	<i>Not Immunized</i>
Contraception & Family Planning		<i>44_Contraception__Fa</i>
Name of Couple		<i>45_Name_of_Couple</i>
Contraceptive Use		<i>46_Contraceptive_Use</i>
	Terminal	<i>Terminal</i>
	IUD	<i>IUD</i>
	Condom	<i>Condom</i>
	Hormonal/Non Hormonal Medications	<i>Hormonal/Non Hormonal Medications</i>
	Other	<i>Other</i>
Reasons for Non Use		<i>47_Reasons_for_Non_U</i>
Selfie with Family/House		<i>48_Selfie_with_Famil</i>


Pravara Institute of Medical Sciences (Deemed to be University)
Dr. Balasaheb Vikhe Patil Rural Medical College, Loni
Department of Community Medicine & Medical Education Unit

**WORKSHOP ON EPICOLLECT 5 AND GOOGLE MAPS
FOR FAMILY ADOPTION AND SURVEY PLANNING**





Dr. Mandar Bavlekar, Associate Professor, Community Medicine,
Dr. Balasaheb Vikhe Patil Rural Medical College, Loni

Workshop Programme

Pre Test

- Epidemiology**
 - Definition
 - Historical Relevance
 - Time, Place & Person Distribution
 - Current Applications
- Spatial Analysis**
 - GIS data
 - File Types
 - Data Entry and Analysis
 - Sample Uses
- Epi-collect 5 (Activity)**
 - Installation
 - Features
 - Sample Form Creation
 - Data entry using Android app
 - Table view/Map view
 - Exporting data file
- Google My Maps (Activity)**
 - Features
 - Importing data file
 - Presentation

Post Test

Assignments: Field Visit, Data Collection, Brief Report Preparation
 Evaluation of Report
 Feedback

Objectives of Workshop

1. Introduce students to concept of Spatial Analysis with reference to Descriptive Epidemiology
2. Explain Basic Concepts of Spatial Analysis
3. Provide hands on training to students for designing simple data collection forms using *EpiCollect 5* and collect geo tagged data of households
4. Provide hands on training to students to import data in *Google My Maps*
5. To assess student reaction and learning
6. To assess feasibility of use of these applications in FAP

Epidemiology

- **Definition:** Study of distribution of determinants of health and health related events
- **Descriptive Epidemiology:** It provides a way of organizing and analyzing data to describe the variations in disease frequency among populations by geographical areas and over time (i.e., **person, place, and time**).
- Describes the distribution of a set of variables without regard to causal or other hypotheses. Personal factors include age, gender, SES, educational level, ethnicity, and occupation.

Pre Test

Historical Relevance

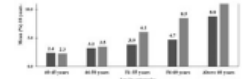
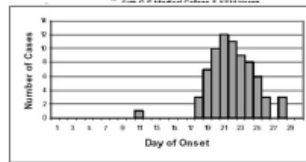


- **John Snow (1813 - 1858)**
Famously explained epidemiology of cholera transmission in London cholera epidemic



Descriptive Epidemiology: Time, Place and Person Distribution

- **Time:** Epidemic Curves
- **Place:** Maps
- **Person:** Incidence by age, sex etc. Any peculiar characters common to infected persons



Spatial Analysis: What is it?

- Study of topological, geometric, or geographic properties and relationships
- Uses **Statistics and Geographical Information Systems (GIS)** facilitates attribute interaction with geographical data in order to enhance interpretation accuracy and prediction.

GIS = Geographic Information System

A GIS integrates hardware, software and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information.



10

Outbreak Investigations

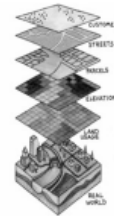
1. Establish existence of an outbreak
2. Verify the diagnosis
3. Construct case definition
4. Find cases systematically and develop line listing
5. Descriptive epidemiology/develop hypotheses
6. Evaluate hypotheses (Analytical studies as needed)
7. Draw Conclusions
8. Conduct additional investigations
9. Communicate Findings
10. Writing the Report



11

Geographical Information Systems (GIS)

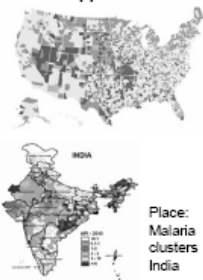
- GIS data represents real world objects (e.g. roads, land use, elevation, trees, waterways, etc.)
- There are 2 broad methods used to store data in GIS
 1. Vector data model
 2. Raster data model



Raster Graphics	Vector Graphics
They are composed of pixels.	They are composed of paths.
In Raster Graphics, refresh process is independent of the complexity of the image.	Vector displays faster when the number of pixels in the image becomes too large.
Graphic primitives are specified in terms of end points and middle point converted into corresponding pixels.	Scan conversion is not required.
Raster graphics can draw mathematical curves, polygons and boundaries of curved primitives only by pixel approximation.	Vector graphics draw continuous and smooth lines.
Raster graphics cost less.	Vector graphics cost more as compared to raster graphics.
They occupy more space which depends on image quality.	They occupy less space.
File extensions: BMP, TIF, GIF, JPG	File Extensions: SVG, EPS, PDF, AI, DXF

11

Current Applications in Epidemiology



Time: COVID Spread in 1 month in USA



12

Software, Data and File Types

A coordinate-based data model that represents geographic features as points, lines, and polygons.

1. Points
Location of Wells, Schools, or Points of Interest
2. Lines / Polygons
Road Centerlines, Rivers, Trails, or Streams
3. Polygons
Boundary of Cities, Lakes, or Forests



A spatial data model that defines space as an array of equally sized cells arranged in rows and columns. Each cell contains an attribute value and location coordinates.



- **Software**
 - ArcGIS
 - QGIS
 - MapInfo
- **Common File Extensions**
 - Keyhole Markup Language (.KML)
 - JavaScript Object Notation (.JSON)
 - Geography Markup Language (.GML)
 - GPS Exchange Format (.GPX)
- **GIS data input techniques**
 1. Digitizing tablet
 2. Heads up digitizing
 3. Automatic scanning
 4. Entry of coordinates via coordinate geometry
 5. Conversion of existing digital data

12



- Desktop
 - <https://five.epicollect.net/>
 - Android
 - Epicollect5 is available for Android phones and tablets, iPhones and iPads. The app is completely free. Use it on as many devices as you like, no limits.
 - Proper Form creation requires desktop mode
 - User Guide
 - <https://docs.epicollect.net/>
- It is developed and maintained by **Oxford Big Data Institute** and it is completely free to use.

13

Entering Location (Lat:0.000000, Long:0.000000)

- The units digit (one decimal degree) gives a position up to 111 kilometers (80 nautical miles, about 89 miles). It can tell us roughly what large state or country we are in.
- The first decimal place is worth up to 11.1 km: it can distinguish the position of one large city from a neighboring large city.
- The sixth decimal gives differentiation of 100 cm. (1 meter)

16

Main Features

1. Drag & drop form builder
2. Single form or multi forms survey (up to 5 hierarchy forms)
3. Photo, video and audio recording
4. Barcode scanner
5. GPS location
6. Branches (Dynamic lists)
7. Groups (More questions on the same page)
1. Conditional logic (jump questions)
2. View data on a table or map
3. Download data (.csv or .json)
4. Project cloning and sharing
5. Public or private (authentication required) projects
6. Data mapping to fit existing third party systems
7. Export data via API
8. User roles management

14



Google MyMap

- Features
- Importing data file
- Presentation
- Go to Google My Maps
- Create New Map
- Base Map
 - Default
 - Satellite
 - Terrain
 - Light Political
 - Monocity
 - Simple Atlas
 - Light Landmass
 - Dark Landmass
 - Whitewater
- Import
- Layer
- Preview
- Share

17

Let Us Create A Project !

- Components
 - Form(s), Entries, Project Settings, Data Visualization, Collaboration, Data Export
- Log In
- Create Project
 - Details
 - Form Builder
 - Save Form
 - Try Data Entry
 - Downloading
 - Opening in excel

15

Post Test

18

Assignments

1. Map Households with Tobacco users in the allotted Field Practice area.
Classify according to Smokers/Chewers and Mishri users
2. Map Households with Hypertensive patients in the allotted Field Practice Area.
Classify according to Controlled and Uncontrolled hypertension
3. Map Households with children under 5 years of age. Classify according to immunization completed and not completed till date.

Total Sample: 80 households

19

Activity

- Prepare a Data Collection Form Using EpiCollect 5

20

Feedback

21

Additional Resources

- Epi collect 5 user guide: <https://docs.epicollect.net/>
- Using Google My Maps:
<https://www.google.com/earth/outreach/learn/visualize-your-data-on-a-custom-map-using-google-my-maps/>
- Dr. BVP RMC Family Adoption Journal:
https://pravara.com/pdf/Family_Study_Journal_2023.pdf
- For Assignments, Case studies, Presentations or further details contact:

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