

HIS Geo-enabling Course - Facilitator’s guide

Module 1: Medical geography

Module duration: 2.5 hours

Module Learning Objectives

By the end of this module, participants will be able to:

- Understand the basic concepts of medical geography
- Understand geographic dimension of public health and its benefits
- Know how geography is applied to public health through examples of use cases from Asia and the Pacific

Suggested References:

- Tanahashi, T. (1978). Health service coverage and its evaluation. Bulletin of the World Health Organization, 1978, 56 (2).
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2395571/> [Accessed on June 2019].

Topics Covered

- The geographic dimension of public health
- The main application of geospatial data and technologies to support health programs in Asia and the Pacific

Session Plan

Time	Title and description	Methods
30 minutes	Session 1.1. Context and objective of the course, agenda and round of introduction of the participants	PowerPoint presentation Round of introduction
60 minutes	Session 1.2: The geographic dimension of public health	PowerPoint presentation; brainstorm, discuss, review handout
60 minutes	Session 1.3: Examples from the Region: <ul style="list-style-type: none"> ● Planning ● Communicable diseases ● Emergency 	PowerPoint presentation; discuss, brainstorm

	management <ul style="list-style-type: none">● Immunization	
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Session Activities

Session 1.1 Context and objective of the training, agenda and round of introduction of the participants (30 minutes)

The facilitator and the participants introduce themselves to the group and providing answers to the following questions:

- What is your experience with maps, GIS, GPS, and other geospatial technologies?
- What do you expect to learn from this course?
- How do you plan to use what you learn from this course?

Depending on the size of the class, the facilitator writes the answers on flip chart pages that remain exhibited on the wall for the duration of the course or keep the answers as a reference on if the expectations are being met.

The facilitator ends this introductory activity and starts the Session 1.1 PowerPoint presentation.

Session 1.2 The geographic dimension of public health (60 minutes)

The facilitator presents the slides that provides introduction to Session 1.2 and lead the discussion with participants on what they think are the geographic dimension of public health.

The facilitator shows the slides for Session 1.2, distributes handouts or e-copies of suggested readings, and engages participants in discussion on how geography is incorporated into the medical field and how public health has benefited from effective use of geospatial data and technologies.

Session 1.3 Examples from the Region (60 minutes)

The facilitator presents the slides for Session 1.3 and shows how geospatial data and technologies have been used in different health programs such as planning, communicable diseases, emergency management, and immunization.

The facilitator then engages the participants in discussion on:

- Their own personal experience in using geospatial data and technologies
- Other examples of use of geospatial data and technologies to support health programs they know of
- Other application of geospatial data and technologies they are interested to learn more about

Module 2: Geo-enabling the Health Information System (HIS)

Module duration: 4 hours

Module Learning Objectives

By the end of this module, participants will be able to:

- Understand the basic concepts of Health Information System (HIS)
- Explain the importance of geo-enabling the HIS
- Understand the HIS geo-enabling framework components and implementation process
- Learn about the HIS geo-enabling implementation in Myanmar, Cambodia, and Vietnam
- Know the benefits of a geo-enabled HIS
- Learn about available HIS geo-enabling resources in the Region

Suggested References:

- Roth S., Landry M., Ebener S. et al. The Geography of Universal Health Coverage: Why geographic information systems are needed to ensure equitable access to quality health care. ADB brief No. 55, April 2016: <https://www.adb.org/publications/geography-universal-health-coverage> [Accessed June 2019]
- Ebener S., Roth S., Khetrapal S. Building Capacity for Geo-Enabling Health Information Systems: Supporting Equitable Health Services and Well-Being for All DB brief No. 88, February 2018: <https://www.adb.org/publications/building-capacity-geo-enabling-health-information-systems> [Accessed June 2019]

Topics Covered

- Geography across the HIS
- The HIS geo-enabling framework components and its implementation
- The Health GeoLab Collaborative

Session Plan

Time	Title and description	Methods
30 minutes	Session 2.1: Geography and time in the HIS	PowerPoint presentation
30 minutes	Session 2.2: The HIS geo-enabling framework - Description	PowerPoint presentation
90 minutes	Session 2.3: The HIS geo-enabling framework - Implementation	PowerPoint presentation Story maps for Myanmar, Cambodia, and Vietnam
45-60 minutes (depends on	Exercise 2.A: Rapid	Group exercise

the number of participants)	assessment of the HIS geo-enabling level among the participants	
30 minutes	Session 2.4: The Health GeoLab Collaborative: A regional resources to support HIS geo-enabling across Asia and Pacific	PowerPoint presentation Website demo

Session Activities

Session 2.1 Geography and time across the HIS (30 minutes)

The facilitator explains the basic concepts of a HIS: functions, uses, importance, etc. She/He describes the importance and benefits of properly integrating the geographic dimensions and time dimensions into the HIS: for the all the program specific information system to share the same geography across time.

Session 2.2 The HIS geo-enabling framework - Description (30 minutes)

The facilitator explains how we passed from the need to properly integrate geography and time in the HIS to the HIS geo-enabling framework.

The facilitator presents the slides introducing the 9 elements of the HIS geo-enabling framework and the benchmarks that need to be reached for each element.

Session 2.3 The HIS geo-enabling framework - Implementation (90 minutes)

The facilitator present how the HIS geo-enabling framework is being implemented in countries based on the content of the HIS geo-enabling toolkit.

The facilitator then presents the story maps for Myanmar, Cambodia, and Vietnam as examples of implementation of the HIS geo-enabling process.

Exercise 2.A Rapid assessment of the HIS geo-enabling level (45-60 minutes)

The facilitator shows the result of the most recent version of the HIS geo-enabling assessment matrix maintained by the HGLC and engage the participants in the discussion aiming at:

- Confirming or updating the matrix based on participants knowledge
- Defining needs and challenges in order to fill the identified gaps

She/He will record the result of the exercise on the differences in the matrix compared to the original one and the feedback from the participants on the needs and challenges to fill the identified gaps and shared these with the HGLC.

Session 2.4 The Health GeoLab Collaborative: A regional resource to support HIS geo-enabling across Asia and Pacific (30 minutes)

The facilitator present the history, vision, and mission of the HGLC before describing the resources that are available to the participants to support the geo-enablement of their HIS through a demonstration of the HGLC website.

The participants are provided with the necessary information to become a member of the HGLC.

Module 3: Geospatial Data Management

Module duration: 6.5 hours

Module Learning Objectives

By the end of this module, participants will be able to:

- Understand the basic concepts of the data-information-knowledge-decision continuum
- Understand and implement the geospatial data management cycle

Suggested References:

- Ebener S. (2016): Guidance for the management and use of geospatial data and technologies in health. Part 1 - Introduction to the data-information-knowledge-decision continuum and the geospatial data management chain. Health GeoLab Collaborative document: http://www.healthgeolab.net/DOCUMENTS/Guide_HGLC_Part1.pdf [Accessed June 2019]
- Ebener S. (2016): Guidance for the management and use of geospatial data and technologies in health. Part 2 - Implementing the geospatial data management cycle: 2.1 Documenting the process and defining the data needs. Health GeoLab Collaborative document: http://www.healthgeolab.net/DOCUMENTS/Guide_HGLC_Part2_1.pdf [Accessed June 2019]
- Ebener S. (2016): Guidance for the management and use of geospatial data and technologies in health. Part 2 - Implementing the geospatial data management cycle: 2.2 Defining the vocabulary, the data set specifications and the ground reference. Health GeoLab Collaborative document: https://www.healthgeolab.net/DOCUMENTS/Guide_HGLC_Part2_2.pdf [Accessed June 2019]
- Pantanilla I., Ebener S. (2018): Guidance for the management and use of geospatial data and technologies in health. Part 2 - Implementing the geospatial data management cycle: 2.3 Compiling existing data and identifying gaps. Health GeoLab Collaborative

document: https://www.healthgeolab.net/DOCUMENTS/Guide_HGLC_Part2_3.pdf
[Accessed June 2019]

- Ebener S., Maude R.J., Gault P. (2018): Guidance for the management and use of geospatial data and technologies in health. Part 2 - Implementing the geospatial data management cycle: 2.4 Creating geospatial data - 2.4.2 Collecting data in the field. Health GeoLab Collaborative document: www.healthgeolab.net/DOCUMENTS/Guide_HGLC_Part2_4_2.pdf [Accessed June, 2019]
- Pantanilla I., Ebener S. (2018): Guidance for the management and use of geospatial data and technologies in health. Part 2 - Implementing the geospatial data management cycle: 2.5 Cleaning, validating, and documenting the data - 2.5.1 Documenting the data using a metadata profile. Health GeoLab Collaborative document: www.healthgeolab.net/DOCUMENTS/Guide_HGLC_Part_2_5_1.pdf [Accessed June, 2019]
- Pantanilla I., Ebener S., Maude R. (2018): Guidance for the management and use of geospatial data and technologies in health. Part 2 - Implementing the geospatial data management cycle: 2.6 Distributing, using and updating the data. 2.6.1 Creating good thematic maps using desktop GIS software. Health GeoLab Collaborative document: https://www.healthgeolab.net/DOCUMENTS/Guide_HGLC_Part2_6_1.pdf [Accessed June 2019]

Topics Covered

- The geospatial data management cycle and its implementation

Session Plan

Time	Title and description	Methods
30 minutes	Session 3.1: Introduction to the geospatial data management cycle	PowerPoint presentation
45 minutes	Session 3.2: Implementing the geospatial data management (Part 1): Documenting the process and defining the data needs	PowerPoint presentation
60 minutes	Exercise 3.A - Identifying the data needs for a particular public health priority	Small group exercise
60 minutes	Session 3.3: Implementing the geospatial data management cycle (Part 2): Defining the vocabulary, the data set specifications, standards, protocols, and	PowerPoint presentation

	ground reference	
60 minutes	Session 3.4: Implementing the geospatial data management cycle (Part 3): Data compilation and gaps assessment	PowerPoint presentation
60 minutes	Session 3.5: Implementing the geospatial data management cycle (Part 4): Data collection and extraction	PowerPoint presentation
45 minutes	Session 3.6: Implementing the geospatial data management cycle (Part 5): Data cleaning, validation and documentation	PowerPoint presentation
30 minutes	Session 3.7: Implementing the geospatial data management cycle (Part 6): Data distribution, use, and update	PowerPoint presentation

Session Activities

Session 3.1 Introduction to the geospatial data management cycle (30 minutes)

The facilitator starts the session by discussing the importance of having good data in order to solve problems related to public health priorities and how this can be achieved by having good geospatial data management. She/He then presents the resources that can help implement the steps in the geospatial data management cycle

Session 3.2 Implementing the geospatial data management cycle (Part 1): Documenting the process and defining the data needs (45 minutes)

The facilitator presents the slide for Session 3.2 and explains the importance of documenting the overall process followed and the steps to do this.

The facilitator explains the concepts and processes to follow to be able to identify the data needed to address the objectives and expected outcomes.

Exercise 3.A Developing a conceptual data model to identify the data needs (60 minutes)

The facilitator create small groups based on health related thematic areas (communicable disease, planning, emergency management,...) or geographic origin.

Each small group is provided with a flip chart and asked to identify:

1. A public health priority and a set of decision they need to take to address this priority
2. If there is a geographic dimension to the priority they need to address and the decision(s) they need to take
3. The data product (maps, graphs or table) they would need to be able to take this/these decision/s
4. The data they would need to be able to generate these data products by making the distinction between the geographic features (geospatial data) and the attribute (statistical data) and develop a conceptual data model.

Each small group would then report to the audience and the facilitator will highlight connections between the different programs needs for geospatial and statistical data.

Session 3.3 Implementing the geospatial data management cycle (Part 2): Defining the vocabulary, the data set specifications, standards, protocols, and ground reference (60 minutes)

The facilitator presents the slide for session 3.3 and discusses the importance for all stakeholders to speak the same language and understand one another. The facilitator presents to the participants different GIS dictionaries that can help in establishing the geographical terms to be used.

The facilitator discusses the six (6) dimensions of data quality and how they are captured by the data specifications and the ground reference.

Session 3.4 Implementing the geospatial data management cycle (Part 3): Data compilation and gaps assessment (60 minutes)

The facilitator discusses the process of acquiring needed data by first compiling data already available: looking for potential sources, checking the metadata, organizing the compiled data, assessing the data, and documenting the data gaps.

The facilitator engages the participants on the merits of compiling available data first and how the whole process relates to the succeeding step of the geospatial data management cycle.

Session 3.5 Implementing the geospatial data management cycle (Part 4): Data collection and extraction (60 minutes)

The facilitator explains the whole process of extracting data from other sources and collecting data in the field.

The facilitator informs the participants that hands-on application of collecting data using a GNSS-enabled device is done on Module 4.

Session 3.6 Implementing the geospatial data management cycle (Part 5): Data cleaning, validation, and documentation (45 minutes)

The facilitator discusses the importance of cleaning and validating the collected and extracted data.

The facilitator why and how the compiled and collected data should also be documented.

Session 3.7 Implementing the geospatial data management cycle (Part 6): Data distribution, use, and update (60 minutes)

The facilitator engages the participants on what should then be done with all the cleaned and validated data. After the participants give their answers, the facilitator discusses the different ways the data can be distributed and used including caveats on restrictions.

The facilitator emphasizes on the importance of updating the data on hand to ensure that it always comply with the six (6) dimensions of data quality and discusses the different ways to update the data.

The facilitator informs the participants that practical application of using the data through creation of thematic maps is done on Module 4.

Module 4: Hands-on Geospatial Technologies

Module duration: 4 hours

Module Learning Objectives

By the end of this module, participants will be able to:

- Know the difference between different geospatial technologies
- Collect data in the field using GNSS-enabled devices based on a defined Standard Operating Procedure (SOP)
- Use the basic functions of a GIS (QGIS or ArcMap)

Suggested References:

- Ebener S., Maude R.J., Gault P. (2018): Guidance for the management and use of geospatial data and technologies in health. Part 2 - Implementing the geospatial data management cycle: 2.4 Creating geospatial data - 2.4.2 Collecting data in the field. Health GeoLab Collaborative document: www.healthgeolab.net/DOCUMENTS/Guide_HGLC_Part2_4_2.pdf [Accessed June 2019]

Topics Covered

- Geospatial data technologies in general, GNSS and GIS in particular
- Field data collection using GNSS-enabled devices

- Basic functionalities of a GIS software (QGIS or ArcMap)
- Availability of resources to explore geospatial technologies further

Session Plan

Time	Title and description	Methods
30 minutes	Session 4.1: Introduction to geospatial technologies	PowerPoint presentation
30 minutes	Session 4.2: Introduction to Introduction to Global Navigation Satellite Systems (GNSS)	PowerPoint presentation
60 minutes	Exercise 4.A: Collecting data in the field using a GNSS-enabled device and GPS essentials	Individual hands-on exercise
45 minutes	Session 4.3: Introduction to Geographic Information System (GIS)	PowerPoint presentation
45 minutes	Exercise 4.B: Using the basic functionalities of a GIS software (QGIS or ArcMap)	Individual hands-on exercise
30 minutes	Session 4.4: Available resources to explore geospatial technologies further (GNSS, QGIS, and ArcMap)	PowerPoint presentation

Session Activities

Session 4.1 Introduction to geospatial technologies (30 minutes)

The facilitator confirms again who among the participants has experience using geospatial technologies (from Module 1 Session 1). The facilitator can conclude that with the advent of smartphones, most participants will likely have used some form of geospatial technology like Google Maps, Maps.Me, or Waze.

The facilitator then presents the slide for Session 4.1 and starts the introduction and discussion on geospatial technologies.

Session 4.2 Introduction to Global Navigation Satellite Systems (GNSS) (30 minutes)

The facilitator gives an introduction on GNSS, how they work and can be used to collect geographic coordinates in the field.

Exercise 4.A. Collecting data in the field using GNSS-enabled devices (60 minutes)

The facilitator explains to the participants of the objective of the exercise. The facilitator presents the information on the data to be collected. The facilitator engages the participants and let them repeat the process to be followed before collecting data in the field (from Module 3 Session 3.5). The facilitator hands out the SOP to be followed in setting up the GNSS-enabled devices to be used and the paper form to be filled out and send the participants out to the field to start collecting data.

When the participants return, the facilitator collects the paper form and encodes the collected data on a spreadsheet. The facilitator converts the collected geographic coordinates into a shapefile and shows the results to the participants.

The participants and facilitator discuss the results of the data collection – not only how the geographic coordinates turn out but also how the other information or attribute are collected.

Session 4.3 Introduction to Geographic Information System (GIS) (45 minutes)

The facilitator introduces the concept of GIS, describe in detail the different components that composes it before describing the software that will be used for Exercise 4.B and Module 5 (QGIS or ArcMap)

Exercise 4.B Using the basic functionalities of GIS software (QGIS or ArcMap) (45 minutes)

The participants use simple data and a generic guide to play with the basic functionalities of the GIS software that has been chosen for the training (QGIS or ArcMap).

The facilitator guides the participants through this exercise.

Session 4.4 Available resources to explore geospatial technologies further (30 minutes)

The facilitator presents the different sources available to be able to further explore the use of geospatial technologies.

The facilitator asks the participants to contribute if they know of any other resources on the subject.

Module 5: Creating good thematic maps

Module duration: 5.5 hours

Module Learning Objectives

By the end of this module, participants will be able to:

- Understand and implement the thematic mapping process
- Create good thematic maps using GIS software (QGIS or ArcMap)

Suggested References:

- Pantanilla I., Ebener S., & Maude R. (2018): Guidance for the management and use of geospatial data and technologies in health. Part 2 - Implementing the geospatial data management cycle: 2.6 Distributing, using and updating the data. 2.6.1 Creating good thematic maps using desktop GIS software. Health GeoLab Collaborative document: https://www.healthgeolab.net/DOCUMENTS/Guide_HGLC_Part2_6_1.pdf [Accessed June 2019]

Topics Covered

- Thematic mapping process
- Data preparation
- Creation of a good thematic map using a GIS software (QGIS or ArcMap)

Time	Title and description	Methods
30 minutes	Session 5.1: The process behind making good thematic maps	PowerPoint presentation
30 minutes	Session 5.2: Preparing the data for use in GIS software	PowerPoint presentation
60 minutes	Exercise 5.A: Preparing the statistical data for use in a GIS software	Individual hands-on exercise
60 minutes	Exercise 5.B: Preparing and uploading the geospatial data in the GIS software (QGIS or ArcMap)	Individual hands-on exercise
30 minutes	Session 5.3: The components of a good thematic map	PowerPoint presentation
120 minutes	Exercise 5.C: Creating a thematic maps using (QGIS	Individual hands-on exercise



	or ArcMap	
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Session Activities

Session 5.1: The process behind making good thematic maps (30 minutes)

The facilitator explains to the participants what makes a good thematic map and how it can be done using the thematic mapping process based on the content of HGLC guidance 2.6.1

Session 5.2: Preparing the data for its use in a GIS software (30 minutes)

The facilitator presents the process that should be implemented in order to prepare the data that will be used to generate the thematic map.

She/He then provides the participants with the context that will be used to generate a thematic map as part of the exercise sessions.

Exercise 5.A: Preparing the statistical data

The participants use a set of raw statistical data that needs to be organized properly organized based on a master list to be used in the GIS software in order to create the thematic map

The facilitator guides the participants during the implementation of the exercise.

Exercise 5.B: Preparing the geospatial data and uploading it in the GIS software (QGIS or ArcMap)

The participants prepare a set of geospatial data based on the master list and ground reference to make sure they are appropriate to create the thematic map.

The facilitator guides the participants during the implementation of the exercise.

Session 5.13: Understanding the value of a good thematic map (30 minutes)

The facilitator explains to the participants what makes a good thematic map and its components based on the content of HGLC guidance 2.6.1

Exercise 5.C: Creating a thematic maps using QGIS or ArcMap

The facilitator guides the participants in creating thematic maps based on the context and cleaned data they have generated during the previous exercises of this module.

The facilitator guides the participants during the implementation of the exercise.