GEOGRAPHIC COORDINATES

MFL Resource Package Training

September 2019
# Agenda

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<td>2. Overview of Steps for Implementation</td>
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<td>3. Action Planning</td>
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Session Learning Objectives

• At the end of today’s session participants will be able to:
  - Describe geographic coordinates and their importance in an MFL
  - Outline the steps for implementing geographic coordinates in an MFL
Review of Terms

• User Requirements
Introduction to Geographic Coordinates
What does it mean to assign geographic coordinates to the MFL?

- Geographic coordinates:
  - Assign physical location data to each health facility in the MFL
  - Provide a more accurate location for a facility
  - Can be visualized as a point on a map

- Important to ensure that all coordinates can be proven reliable
Importance of Geographic Coordinates

- Facilitate management of health programs
  - Defines where health facilities are located and programs they provide
  - Helps with equity, access, and gaps in service provision
  - Helps with budgeting and planning for activities, goods, and human resources
Importance of Geographic Coordinates

• Links the MFL to other spatially distributed datasets
  – Helps to understand location of facilities in relation to factors like:
    • Population distribution
    • Transportation networks
    • Markets
    • Climate
    • Agriculture patterns

• Assists with managing the MFL
  – Helps to flag potential duplicates
Steps for Implementation of Geographic Coordinates
Steps for Implementation

1. Define geographic schema to be used
2. Define the level of accuracy required
3. Select persons responsible for obtaining and maintaining the geographic coordinates
4. Decide what data sources will be used
5. Conduct primary data collection
6. Validate the geographic coordinates
7. Maintain the geographic coordinates
8. Decide how widely to share the geographic coordinates
I. Define the geographic schema

• Three main elements in a schema:
  – Reference point (0,0)
  – Units of measure (meters, degrees, etc.)
  – Mathematical algorithm (datum) representing curvature of the earth

• Recommended to use: latitude and longitude in decimal degrees, with WGS84 as the datum

• If more than two schemas are used, define one as the primary schema
  – If local coordinates are available they should be used as a secondary schema to the global schema

• Schemas must be clearly defined and documented so all MFL users can access and understand the data
2. Define the level of accuracy required

- Accuracy refers to how well or close the data corresponds to the true facility location
  - If the coordinates will be used for navigation then they must be highly accurate
  - If used for planning, a lower level of accuracy is OK

- Level of accuracy reflects the level of effort needed for data collection
  - Obtaining highly accurate coordinates requires visiting the location
  - Less accurate ones can be obtained using a software, like Google Maps

- Coordinates should be reviewed every few years to retain viability and to meet users needs
3. Select the person(s) responsible for geographic coordinates

- Responsibilities include:
  1. Create and carry out procedures for collecting geographic coordinates
  2. Identify validation processes
  3. Assess and validate geographic coordinates
  4. Maintain and share geographic coordinates
  5. Respond to inquiries about the geographic coordinates
  6. Document procedures for assigning geographic coordinates in the MFL and making them accessible to users
3. Select the person(s) responsible for geographic coordinates, cont’d

- Responsibilities can be divided up or assigned to one person
- Can be managed centrally or regionally
- Person(s) tasked with maintaining the MFL should be with the same institution as those managing the overall MFL
- More than one person should be involved in assessing coordinates in case key staff leave
4. Determine Data Sources to Obtain Geographic Coordinates

- Determine if you will collect new data or use existing coordinates
  - Are existing data trustworthy?
  - Do they meet schema and accuracy requirements?
  - Is the data collection method well documented?
- If no trustworthy data exist, then new data will have to be collected
- Assess data for:
  - Completeness
  - Accuracy
  - Precision
  - Validity
4. Determine Data Sources to Obtain Geographic Coordinates, cont’d

• Next, compare identified geographic coordinates from different lists with each other
  – Matches do not need to be exact but within a reasonable range
  – Large discrepancies will require further validation

• The outcome of the review should produce a list of coordinates by status:
  – Validated (ready to use)
  – Provisional (needs to be validated)
  – To be collected (missing or unusable geographic coordinates)
5. Conduct Primary Data Collection

- Develop the action plan
  - Site visits OR GPS data collection
  - Address data gaps
  - Document protocol and training
  - Create feedback mechanism

- Primary data collection
  - Use GPS receiver or GPS enabled devise (i.e. smartphone or tablet) with:
    1. Targeted visits to facilities to collect geographic coordinates
    2. Adding GPS data collection to routine or planned visits
5. Conduct Primary Data Collection, cont’d

- Cartographically determine location (if unable to do site visits)
  - Cartographically document site locations until they can be visited

- Address issues in data
  - Look for duplicates, i.e. two places with the same coordinates but different names
  - Need to develop a procedure for documenting and resolving duplicates

- Document data collection procedures
  - Ensure data collection is standardized
  - Agree on data storage and transfer
5. Conduct Primary Data Collection, cont’d

• Perform data quality checks
  – Best way to validate is to have someone visit the site and confirm the coordinates
  – Check these coordinates against previously recorded ones
    1. Do they conform to the schema?
    2. Compare coordinates to other known locations.
    3. Are they near or on the border of an administrative unit?
    4. Are they on or near a road or in the center of town?
    5. When mapped over imagery, is the location an improbable site? (i.e. in a river or forest)
6. Validate Geographic Coordinates

- Validation is required regardless of data source
- Necessary to verify the accuracy of the geographic coordinates and its assignment
- Pre-define a specified margin of error
- May need to validate by revisiting a site
- Requires careful training
- Include data collection and verification date
7. Maintain the Geographic Coordinates in the MFL

• Ensures reliability and trust in the MFL

• Need to accommodate regular changes to the list

• Need to set aside resources to collect and maintain geographic coordinates

• Four main factors to maintain geocoding
  – Processes to identify changes
  – Methods for checking geographic data
  – Update documentation of geographic data elements
  – Schedule a mapping review
8. Decide How Widely to Share the Geographic Coordinates

- Decision should be made in line with policies and governance around the MFL
  - Is there a trade off in value between the utility of the data for the MFL stakeholders and data sensitivity?

- Consider:
  - Data access
  - Data formats and metadata, so users can:
    - Manipulate geographic data elements
    - Integrate MFL data with other geographic data
  - Feedback on geographic coordinates
Activity 1: What steps on the checklist need to be done for valid geographic coordinates?
Activity

• Review the Kenya MFL Map
  – http://kmhfl.health.go.ke/#/home

• Review the Tanzania MFL Map
  – http://hfrportal.ehealth.go.tz/

• Discuss the geographic coordinates features of the MFLs
  – What would work in your country?
  – What would not work in your country?
  – What do you need to get geographic coordinates?
Summary and conclusions