**User Needs Analysis for the Development of the**

**On-Line Impact Assessment Toolkit**

**Introduction and Objectives**

Michigan State University, in partnership with the Ingham County Health Department, is developing a GIS-based analytic toolkit for evaluating the effects of local planning and decision making on community health and health equity in Michigan’s Capital Region.[[1]](#footnote-1)

It is our goal to develop information resources, research, and planning support tools to create an open access, integrated, and comprehensive information resource unprecedented in the other communities in the U.S. These visualization and analytical tools will allow users to access data on the public health and related impacts of various development types ranging from housing to commercial to office and to industrial development throughout the region. The Regional Impact Assessment Toolkit and Information Resource (“HIA Tool”) can demonstrate exact parcel relationships within the region; pollution levels; and proximity to schools, trails, commerce centers, fresh food grocers, farmers markets, and emergency services; and many other indicators of public health.

When completed, the online HIA Toolkit will meet the following objectives:

* Provide GIS data access, visualization, and mapping capabilities to communities and the public in Clinton, Eaton, and Ingham Counties, freely accessible via the Tri-County Regional Planning Commission website.
* Incorporate information and methods to assess the environmental, social, economic, health, and energy effects of local and regional policies, programs, and projects in a geospatial format.
* Allow multiple users/stakeholders to view and assess potential impacts on-line.
* Provide opportunities for public discussion and debate through the graphic user interface and the *MindMixer* application, accessible via the MMPGS Portal.
* Provide training and technical support to communities within the region in the adoption and use of the toolkit in local planning and decisionmaking.
* Seek additional funding resources to maintain and upgrade the toolkit as new technologies unfold.

**User Needs Analysis**

Toolkit development will be based, in part, on a user needs analysis. Initially, user needs analysis will focus on the FAHP and URSM HIA stakeholder scoping meetings being conducted under the Health Impact Assessment Project and public interactions in other regional projects. The user needs analysis will help ensure that the HIA Toolkit meets the needs of the target users in regional and local governments and private sector. This analysis will address the identified data needs, sources, and topics and impact assessment functions that will be included in the toolkit.

The user needs analysis was developed to determine the primary users of HIA/Impact Assessment Tool and how they would use the tool in their decision-making process. The analysis focused on input from stakeholders identified in the local and regional programs summarized in the proceeding section, meetings and informal interactions with individual stakeholders or their representative organizations, and HIA project participants. This process provided a good overview of user categories and their needs; the types of information used in decision making; and gaps in data availability, access to technology, funding, and public support.

In addition, a survey questionnaire was developed and administered to community planners, leaders, and other HIA-related program participants to characterize the potential user community in the Capital Region. A summary of the results of the survey instrument is provided in Appendix A.

**Background: Need for a Regional Impact Assessment Toolkit and Information Resource**

The objectives of the HIA Toolkit were established through a focused regional effort to provide communities in the Capital Region with information and tools to make informed decisions regarding land use, create regional economic opportunities and competitiveness, build healthy and sustainable communities, and include multiple stakeholders – particularly underserved and disadvantaged populations – in the decision process.

For more than 10 years, guidance and technical support for this regional effort has been provided by the Land Use and Health Resource Team (LUHRT), which is sponsored by the Ingham County Health Department and supported by the health departments of Clinton and Eaton Counties. Regional partners include the Tri-County Regional Planning Commission (TCRPC), Michigan State University, Capital Area Health Alliance, the Power of We Consortium, Capital Area Transit Authority, local jurisdictions, neighborhood associations, NGOs, and many other public and private sector organizations.

Input on the content, capabilities, functions, and user interface of the HIA Tool was gleaned from extensive communications with representatives of the regional partners. The partner organizations offered several general requirements of the on-line tool and information system, such that the HIA Tool would:

* Support the TCRPC Regional Growth Plan by helping communities prioritize land-use issues and meet information needs.
* Support local efforts to incorporate HIA in land-use decision making, ranging from policies and programs to individual projects. The prototype HIA Tool will use as templates the Fair and Affordable Housing Plan (FAHP) and the Urban and Rural Services Management Policy (URSM), which is being coordinated with two projects funded under the Mid-Michigan Program for Greater Sustainability administered by the Tri-County Regional Planning Commission.
* Use National Association of City and County Health Officials (NACCHO) recommendations for healthy communities to support local the master plans and zoning ordinances of local governments by incorporating the HIA Checklist adopted by Meridian Township and in use since 2005.
* Evaluate developments from the standpoint of water and air quality, wastewater treatment, solid and hazardous waste management, social capital, physical activity, health equity, public transportation, and food accessibility.
* Use a GIS Data Development Matrix (Appendix B) that will provide guidelines to local planners and decision makers to better understand (a) potential impacts and other planning considerations e.g., a question a user might ask about a project); (b) data attributes (e.g., what must be measured in order to assess an impact); (c) data requirements, type, source, availability, and quality/accuracy; and (d) critical threshold or alert in the event the resulting information and analysis suggests a significant impact.
* Create access to environmental health information for the health departments in Clinton and Eaton counties similar to that provided by the ICHD Environmental Health Mapper.

**Primary User Community**

Michigan is a “home-rule” state. Virtually all land-use decisions that could affect community and human health and the environment are made at the local level. In the three counties within the Capital Region, there are 108 townships and charter townships, six small-to-medium-sized municipalities (East Lansing, DeWitt, St. Johns, Grand Ledge, Charlotte, Holt, and Mason), seven medium-to-large charter townships (Meridian, DeWitt, Watertown, Bath, Delta, Delhi, and Vevay), 20 villages, and the City of Lansing. Seventy-eight of these units of government have primary planning, zoning, and decision-making authority.

Based on discussions with representatives of local governmental units who have long been affiliated with LUHRT-related projects, it was determined that the principal users of the Impact Toolkit would most likely include administrators, planners, and engineers employed by local and county governments; elected and appointed local and county officials; landowners and developers; and members of the public affected by land-use proposals. These assumptions appear to be supported in the survey results. The survey indicated that more than 48% of respondents were affiliated with local, county, or state government. Nearly 26% identified themselves as professional planners. Approximately 13% of respondents identified themselves as a member of a non-governmental organization, volunteer group, or special interest group and slightly more than 3% represented the private sector.

**Analysis of User Requirements**

All survey respondents indicated that their organizations had access to the Internet and more than 80% indicated that their organization maintained a website that provided public access to information that is used in the decision making process. In contrast, only about a third of the participants indicated that they had adequate access to the information they needed in making informed decisions. Reasons given for this disparity included limited access to or knowledge of data sources (26%), limited financial resources to obtain data (23%), or lack of expertise or training (36%).

Data and Information Needs

Responses from survey participants on data requirements by local communities are provided in Table 1. Based on suggestions made by stakeholders, the following data resources have been identified and integrated into a GIS Data Development Matrix (discussed above and attached as Appendix B), which will serve as a data dictionary. The data dictionary tracks data type, sources, limitations, etc., and the required permissions from various agencies responsible for creating and maintaining data.

* State and national scale geospatial datasets as available.
* County-level data per *Environmental Health Mapper*:
  + Parcel boundary, PIN, owner (County Equalization Department)
  + Pollution Prevention locations
  + Well data/chemistry
  + Groundwater contamination sites
* Parcels. Parcel-level data and parcel boundary files to be provided and maintained by three county health departments. Technical assistance will be provided to county GIS personnel to ensure digitizing accuracy.
* *Data Sources/CDC* will be used as initial guidance for HIA-related data requirements (electronic document to be provided in reference materials).
* Initial data requirements will be project-specific as identified in the scoping phase of the Health Impact Assessment:
  + Fair and Affordable Housing Plan
  + Urban & Regional Service Management Areas Policies
    - Regional water and sewer infrastructure
    - Additional data from local units of government.
* In order to ensure sustainability of the project, data will remain as property of organizations owning the data. These organizations will be responsible for maintaining, updating, and verifying accuracy.
* Data permissions will be coordinated with TCRPC; some conditioning may be required.

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| **Data Type** | **Data Use in**  **Order of Preference (%)** |
| Present and Future Land Use | 48.4 |
| Parcel Boundaries | 45.2 |
| Parks, Trails, etc. | 45.2 |
| Zoning Categories | 35.5 |
| Infrastructure | 35.5 |
| Roads, Storm/Sanitary Sewer, etc. | 35.5 |
| Schools | 35.5 |
| Floodplains | 32.3 |
| Water Features | 29.0 |
| Green Space | 29.0 |
| Housing | 29.0 |
| Soils | 19.4 |
| Water and Sewer Service Areas/Boundaries | 19.4 |
| Census Data | 19.4 |
| Vegetation | 16.1 |
| Public Wells | 16.1 |
| Food Resources | 9.7 |
| Chemical Storage; Potentially Contaminated Sites | 9.7 |
| Waste Disposal Locations | 6.5 |
| Health data | 3.2 |
| Other (Do not use geospatial data) | 32.3 |

**Table 1. Data Requirements and Potential Use in Local Decision Making**

Information System Access Requirements

All survey respondents indicated that their organizations had access to the Internet and more than 80% indicated that their organization maintained a website that provided public access to information that is used in the decision making process. Of those websites identified, only 25% provide data to all stakeholders potentially affected by local decisions. Most communities cannot afford to provide capital investment and sustaining funding to maintain an active GIS. Approximately 22% of survey respondents indicated that their organizations had some form of GIS capability, usually ArcGIS, ArcMap, or Google Maps. Some communities provide only static maps online and some communities subcontract their GIS capabilities to outside vendors.

Interaction with stakeholders participating in the HIA1 Fair and Affordable Housing Plan and HIA2 Urban and Rural Service Management Policy, community representatives, and TCRPC project partners provided a set of functions that the fully operational version Tool should provide. This includes: (a) links to measurable community health indicators and community goals for healthy community design; (b) ability to identify and locate at-risk populations and potential environmental risks; (c) additional links to online resources, best practices, HIA practitioners, government and private sector entities using HIAs, and other resources as appropriate; (d) links to projects that have used the toolkit, initially focusing on HIA1 and HIA2 case studies; and (e) documentation that will facilitate adaptation of the online toolkit by other jurisdictions.

Mapping and Analysis Requirements

Since nearly all data used in local planning related to land use and impact assessment has a geospatial or locational attribute, we decided to include a GIS functional component to the Tool. Simply providing access to data without the ability to determine the importance or context of data and information will not necessarily lead to more detailed and timely assessment of impacts of a proposed project or better decisions. Adding a GIS capability would provide the ability to map and visualize information about a location, as well as some ability to manipulate data to provide additional information about a project.

When asked whether the local government, businesses, or other organizations provide access to this information, only about a third of respondents indicated that such data were available. To determine what communities provided online access to geospatial data in a mapping/visualization format, a review of county and local government websites was conducted. Results of the review are as follows:

Clinton County GIS ( <http://www.clinton-county.org/Departments/MISGIS.aspx> ): Aerial photos, base map, parcel boundaries, section lines, school districts, zip codes, water features, railroads, roads, emergency management services, and fire stations. Bath Charter Township provides access to zoning districts. The City of Dewitt provides access to parcels, zoning districts and watershed boundaries.

Eaton County GIS ( <http://www.eatoncounty.org/departments/information-systems/gis> ): Aerial photos, base map, parcel boundaries, section lines, cell towers, school districts, zip codes, contours, 500-foot water buffers, watersheds, water features, railroads, roads, soils, emergency management services, fire stations, and road and drain centerlines. Delta Charter Township provides access to aerial photos, base map, parcel boundaries, water features, railroads, roads, soils, economic development sites, and parks.

Ingham County Health Department, Bureau of Environmental Health Mapper

( <http://hdgis.ingham.org/ICHD/Map.aspx> ): Aerial photos, base map, parcel boundaries, section lines, government boundaries, well data, wellhead protection zones, water features, restaurants, railroads, roads, and pollution prevention sites. The cities or villages of Lansing, East Lansing, Williamston, Mason, and Stockbridge and the Charter Townships of Meridian and Delhi generally provide access to zoning districts and land use. Lansing includes infrastructure, parks, historic districts, economic development zones, water features, and flood zones.

Overall, two of the three counties – Clinton and Eaton – maintain a countywide GIS. The Ingham County Environmental Health Mapper provides somewhat comparable data, but a more comprehensive and useful user interface. Of the 48 townships in the Capital Region, only six provide some mapping capability and of the 28 cities and villages, seven provide some mapping capability. When asked to rate their GIS capability, approximately 10% indicated that their GIS met both current and future needs. Approximately 22% indicated that the GIS would meet present and future needs only with significant upgrades in equipment, software, data, and training. The balance of the respondents did not have a local GIS capability.

When asked if a free GIS-based mapping and impact assessment tool was available on line, providing access to the data listed above and the health impact assessment checklist, would their local government, business, or other organization be interested in using this tool in its decision-making process, more than 93% said yes. Column 1 in Table 2 shows the types of land-use decisions that typically use geospatial information resources based on survey results. Survey respondents indicate the applications a community GIS is currently being used (Column 2) and might use if a free toolkit was available on-line (Column 3).

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| **Local Decision Making Using Geospatial Data/Information Resources** | **Currently Being Used (%)** | **Would Use If a Free On-Line Tool was Available (%)** |
| Community planning, permitting, and zoning | 41.9 | 67.7 |
| Conducting neighborhood and community related projects | 25.8 | 67.7 |
| Conducting public and community health assessment | 22.6 | 54.8 |
| Planning, designing and constructing residential, commercial, or industrial projects | 19.4 | 25.8 |
| Conducting environmental impact assessment | 16.1 | 45.2 |
| Engineering, building and maintaining public infrastructure | 16.1 | 12.9 |
| Conducting economic redevelopment and impact assessment | 12.9 | 48.4 |
| Planning, designing and constructing roads and highways | 9.7 | 16.1 |
| Taxation | 9.7 | 6.5 |
| Designing and implementing fair and affordable housing projects | 6.5 | 35.5 |
| Health impacts associated with climate change | 3.2 | 54.8 |
| Other (Do not use a GIS in decision making) | 41.9 | 19.4 |

**Table 2. Potential Land-Use Decisions Supported by Geospatial Information Resources**

**System Design and Functional Specifications**

User Interface and Access

Based on results of the user needs analysis, the principal goal that the Health Impact Assessment/Energy Impacts Tool will be to facilitate the incorporation of health impacts into local planning, land use, transportation, and development design and permitting decisions in the municipalities in the Capital Region, through the development, dissemination, and implementation of a detailed, robust online toolkit. The toolkit will be readily available to the public, and will include documentation and training that will allow users within the region to download, replicate, and adapt it for planning, public discussion, and decision making.

The HIA Toolkit will be housed and accessed at TCRPC (<http://www.mitcrpc.org/>), by which the toolkit will serve as a planning support resource by the primary user community. In addition, the HIA Toolkit will be accessible to the public via the MMPGS Portal (<http://www.midmichigansustainability.org/>). The toolkit Home Page will provide an overview of the application, links to information about tool functions, and instructions on using the toolkit. A direct interface with the *MindMixer* Public Forum will also be provided. The Health Impact Assessment Project Team will assist TCRPC in maintaining the on-line interface and data server and will continue to evaluate new technologies that will enhance the capabilities of the toolkit.

Tool Development, Access, and Use

Based on results of the user needs analysis, the HIA Toolkit will provide online visualization, query, and assessment capability for the topics and health and energy-related issues identified in the needs analysis and report. Data analysis will include information about the affected environment, and will include vulnerable populations within project areas, and integrate ArcGIS data pertinent to regional health and land use and built environment decisions. The toolkit will include exact parcel relationships to transit routes, complete streets implementation community mapping updates, contaminated areas, schools, transit services, trails and open space, commerce centers, fresh food grocers, farmers markets, community gardens, emergency services, and other resources important to health. The toolkit will also include a set of standardized recommendations that can be incorporated in plans, development design, and permit conditions to address the health and energy impacts included in the toolkit.

In addition, the user groups made several recommendations regarding the functionality of the toolkit, including:

* A Base Map will be created to cover Capital Region, but generally bounded by Clinton, Eaton, and Ingham county boundaries. Reference points may include township and municipal boundaries, highways and roads, major geographic landmarks.
* Geospatial data/thematic maps (as available) will provide the ability to overlay and visualize available data at specific locations throughout the Capital Region.
* A query-based toolkit using a digital version of the Meridian HIA Checklist will provide simple analysis capabilities, draw/pinpoint prospective project location, project description (provided by local unit of government permitting agency), metrics: proximity, presence/absence, yes/no; and variable descriptions.
* The toolkit will provide impact assessment using a digital version of the Meridian HIA Checklist and the Matrix.

The fully operational version of the complete toolkit will include: (a) measurable community health indicators and community goals for healthy community design; (b) identify and locate at-risk populations and potential environmental risks; (c) include links to online resources, best practices, HIA practitioners, government and private sector entities using HIAs, and other resources as appropriate; (d) links to projects that have used the toolkit; at least two case studies of successful applications of the toolkit; and (e) documentation that will facilitate adaptation of the online toolkit by other jurisdictions. A schematic depiction of the user interface is shown in the enclosed figure. A similar set of operational variables will be developed in coordination with the energy-related projects.

Regional Environmental Health Information System

The ICHD Environmental Health Mapper (<http://hdgis.ingham.org/ICHD/Map.aspx>) which will be used as a template for visualizing and mapping environmental health data housed within the county, including well logs, pollution prevention sites, potentially contaminated soils and groundwater, and so on. Data can be viewed at both county and regional scales, as well as by individual parcels. The toolkit will ultimately provide access to comparable data for both Eaton and Clinton counties using EH Mapper as a template. In addition to maintaining ICHD EH Mapper, we will assess GIS capabilities and data resources in the other counties and provide training to county GIS personnel in establishing the parcel-level base maps, conditioning data, and building the interfaces. All three counties will then comprise a regional environmental health mapping application.

Integration with Local Planners and Decision Makers

To ensure that the toolkit can be seamlessly applied to target decision-making processes, develop appropriate metrics, interfaces, and toolkit content to make the toolkit compatible with master planning and zoning ordinances, permit requirements, and other legal standards. In coordination with appropriate officials in the target jurisdictions, develop and secure the implementation of at least two new policies that integrate the use of the HIA Toolkit and/or the HIA Checklist into planning or permitting decisions. These will include a Health Equity Impact Review Tool for local governing boards and commissioners, and a countywide policy to encourage the use of HIA and the HIA Toolkit and Checklist in local decisionmaking. The Health Impact Assessment Project Team will conduct trainings on the use of the toolkit for interested local community organizations and officials.

**Attachments**

Appendix A: HIA On-Line Impact Assessment Tool – Survey Questions and Results

Appendix B: HIA Checklist, GIS Specifications, and Data Requirements

1. This toolkit is being developed under a Health Impact Program grant from a collaboration of the Robert Wood Johnson Foundation and the Pew Charitable Trusts (i.e., Pew Grant). Additional funding is being provided by the U.S. Department of Housing and Urban Development as part of the Mid-Michigan Program for Greater Sustainability. Michigan State University is also providing substantial matching funds to support this project. [↑](#footnote-ref-1)