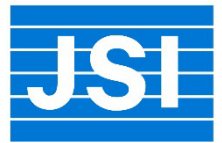




USAID
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BUILDING HEALTHY CITIES

Project Accomplishments Report

October 2022



Source: Damodar Bachani/JSI



Source: Amanda Pomeroy-Stevens/JSI

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ACRONYMS

Bappedda	City Planning and Development Agency
BHC	Building Healthy Cities
CRS	citizen reporting system
CSO	civil society organization
HPS	Health Promoting Schools
IOM	International Organization for Migration
ISCDL	Indore Smart City Development Ltd.
JSI	JSI Research & Training Institute, Inc.
PPP	public private partnership
USAID	United States Agency for International Development
WFS	Waste-free Schools program

Building Healthy Cities

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INTRODUCTION

Since 2017, the United States Agency for International Development (USAID)-funded Building Healthy Cities (BHC) project has worked to improve healthy urban planning in four rapidly growing Smart Cities in India, Indonesia, Vietnam, and Nepal. This work is critical because as the world urbanizes, cities must be able to address the urban challenges that affect citizen's health in an organized, coordinated way. These challenges include infrastructure constraints, pollution, health care, and transportation issues, and are a particular threat to the health of vulnerable populations, including women and children. As the project comes to a close, we are confident that it has left a lasting legacy, and the good work we began with our city partners will continue. This final report summarizes key project and partner city accomplishments over the last five years.

BHC engaged sectors that contribute, directly or indirectly, to citizen's (particularly women and children) health and quality of life. This multisector engagement, the first core value of BHC, aimed to provide all municipal sectors a common understanding of how they contribute to health. The second BHC core value was to strengthen community engagement in municipal decision-making, especially for those most vulnerable to health shocks. BHC's third core value was supporting the use of data for planning and decision-making.

Figure 1. Elements of Healthy Urban Planning



BHC tested innovative approaches to healthy urban planning in each of its four rapidly growing partner cities in Asia: Indore, India; Makassar, Indonesia; Da Nang, Vietnam; and Kathmandu, Nepal. All four are Smart Cities and secondary cities (see definitions below), key reasons why USAID and BHC chose to partner with them.

Smart City

Although initiatives vary by country, Smart Cities generally leverage information and communications technology, the built environment, and the “internet of things” to improve their citizen’s lives. Activities cut across sectors. The aim of the initiative is to provide residents with an efficient and reliable infrastructure, enhanced quality of life, and economic opportunities.

Secondary City

The definition of secondary cities is contextual and varies by country context, but often relates to population size (less than 5 million), and sub-national economic or political influence in relation to larger “primary” cities.

-USAID Asia Bureau



Table 1. BHC Partner Cities

<p>Da Nang City is one of the five municipalities of Vietnam. Thanks to its strategic location along the East–West Economic Corridor, the city has become a driving force for economic development not only in the central region, but also in the entire country. Da Nang has developed rapidly over the last 20 years. The city is now one of the most attractive tourist destinations in Vietnam.</p> <p>Learn more about BHC’s activities in Da Nang through our interactive infographic.</p>	<p>Implementation Period: 2019 – 2021</p> <p>BHC's Local Partner: Thrive Networks / East Meets West Foundation</p> <p>Population: 1.1 million</p> <p>10 Year Growth Rate: 7.6 percent</p>
<p>Indore is the largest, most populous city in Madhya Pradesh, and is the state's commercial capital. It is also one of the fastest-growing cities in India. For the past five years, Indore has held the title of the cleanest city in India from the National “Swachh Bharat” or “Clean India” campaign. The city is also well known for its food streets.</p> <p>Learn more about BHC’s activities in Indore through our interactive infographic.</p>	<p>Implementation Period: 2018 – 2022</p> <p>BHC's Local Partner: John Snow India Pvt Ltd</p> <p>Population: 3 million</p> <p>10 Year Growth Rate: 3.6 percent</p>
<p>Kathmandu Valley is the political, cultural, and financial center of Nepal. It is also well known for its air pollution. In recent years, the valley has experienced rapid urbanization and population growth; the corresponding widespread urban infrastructure development increased air pollution. The bowl-shaped valley prevents air pollutants from dispersing, while temperature inversions during the winter months increase air pollution. Kathmandu is the only BHC city that is not formally a Smart City.</p>	<p>Implementation Period: 2020 – 2021</p> <p>BHC's Local Partner: JSI</p> <p>Population: 1.5 million</p> <p>10 Year Growth Rate: 6.5 percent</p>
<p>Makassar is the fifth largest city in Indonesia and has a large migrant population. The city is expected to double its current population by 2030. Makassar is the provincial capital of South Sulawesi, and is a trading center; nearly half of the economy of South Sulawesi is concentrated in Makassar. The city is the most urbanized part of eastern Indonesia.</p> <p>Learn more about BHC’s activities in Makassar through our interactive infographic</p>	<p>Implementation Period: 2018 – 2022</p> <p>BHC's Local Partner: International Organization for Migration (IOM)</p> <p>Population: 1.6 million</p> <p>10 Year Growth Rate: 1.29 percent</p>

MULTISECTOR ENGAGEMENT

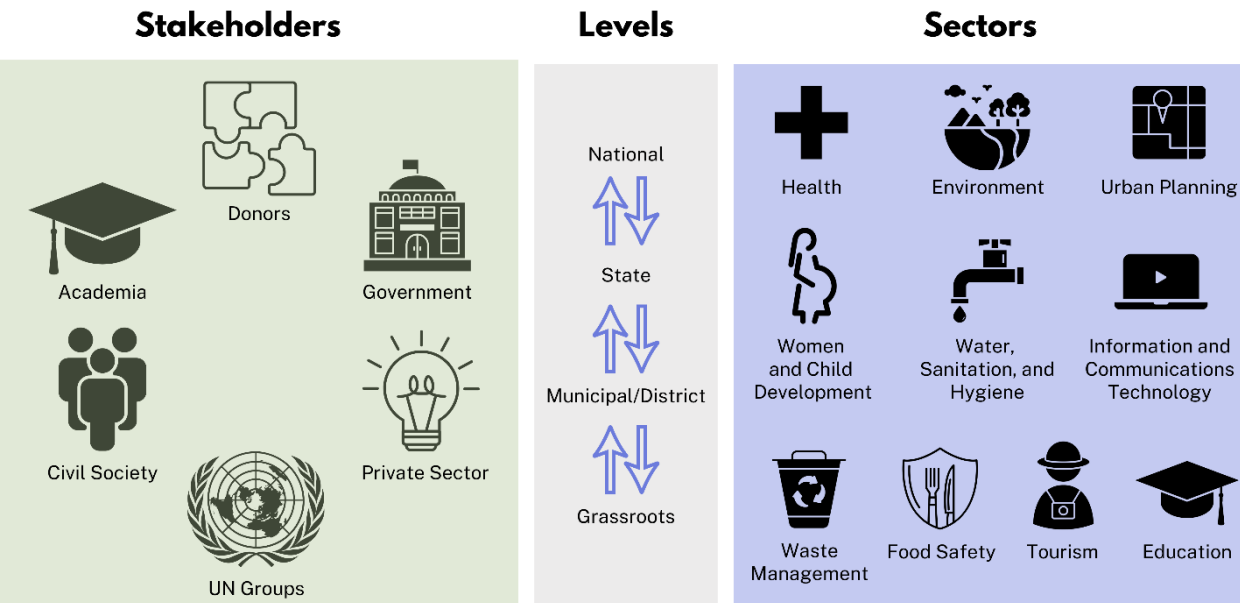
Key Accomplishments

- Engaged an average of 22 different stakeholder groups in each city on communication, coordination, and collaborative activities over the course of the project. This includes, across all cities, 10 private sector organizations and 22 civil society organizations (CSOs).
- 678 people participated in systems mapping activities across 4 cities, including:
 - 238 government staff;
 - 313 community members; and
 - 127 non-government stakeholders (from academia, private sector, donor/UN groups, and CSOs).
- Facilitated four city planning documents: two Healthy City Action Plans in Indore and Makassar, a recommendations document in Da Nang, and an implementation plan for air quality management in Kathmandu.
- 133 new Smart City projects related to health and adopting healthy lifestyles were initiated by city officials over the life of the project.
- 17 city or state policies were influenced by BHC data or processes.
- For every project dollar spent by BHC, three partner cities (Da Nang, Indore, Makassar) put in an average of 45 cents (total of US\$ 294,170), and private partners put in an average of 16 cents (total of US\$ 103,510). This amounted to a combined 38 percent cost share.
- The percent of relevant sectors across three partner cities (Indore, Makassar, Da Nang) that included urban health activities in their yearly workplans increased from 11 percent in project year 3 to 64 percent in project year 5.
- Established multisector health working groups in three cities, and worked closely with an existing entity in the fourth.
- Trained city officials in Makassar to apply a systems approach to the process they use for soliciting community input on government long-term workplanning.
- Supported 163 schools in three cities (Da Nang, Indore, Makassar) to establish multisector activities and learning programs to support healthier students and schools. Trained 362 teacher advocates and student ambassadors, and developed two training manuals for multisector school-based programs.

Bringing Key Partners Together

People who live in cities have complex needs that span many government departments, or sectors. It is important that these groups work together to meet citizens' needs. This is why BHC identified multisector engagement as one of our three core values of healthy urban planning. To BHC, multisector engagement means deliberate and sustained collaboration across many sectors to improve the health and livability of a city. Over the last five years, BHC worked to engage with and connect a wide range of partners including government, private sector, academia, community groups, and others. BHC's [partner map](#) provides a visual representation of all the stakeholders BHC engaged.

Figure 2. Key Stakeholders and Sectors



“Urban development needs holistic thematic discussion, integrative **coordination**, and spatial mapping to identify problems and find solutions to tackle the problems.”

– Muhammad Amri Akbar,
Head of the Social Culture and Government Department,
Makassar

In Da Nang, Indore, and Makassar, BHC established or expanded multisector health working groups that are now run by city officials. In Kathmandu, BHC worked with an existing multisector committee. These groups and committees provided a sustainable platform for city officials to engage the private sector and civil society to improve health and health-related programs. They were designed to work on a timeline and using a mechanism

that best fit each city's context. For example, the Makassar Healthy City Forum met regularly to identify areas for cross-sector work to improve health and health-related programs. In Da Nang, group meetings were organized by key topics of interest to the city government (e.g., food safety, waste management, and including young people with disabilities) to foster multisector collaboration.

Engaging the private sector was another important project focus. BHC found that while individual sectors have succeeded in developing private sector relationships, the same is not true for multisector urban health projects. To fill this knowledge gap, BHC researched the use of public private partnerships (PPPs) to meet local urban health needs. The result was a [brief](#) that introduces key concepts and summarizes PPP benefits, challenges, and opportunities; the team also prepared a companion [brief](#) that offers guidance to local leaders and reviews the PPP landscape in three BHC partner cities. In practice, BHC facilitated connections to 10 private sector groups to help fund BHC activities as well as potential support to the cities once BHC ended. The most notable partnership was the handover of the low-cost air quality sensor network and Clean Air Guides program to the Confederation of Indian Industry, who is now working with Indore Smart City Development Ltd. (ISCDL) to continue this BHC-initiated work.

“How do we integrate urban health in the Smart City framework? Of course a piece is participation of the **private sector**. Operationalizing and getting innovative business models will facilitate collaboration between various stakeholders.”

– Kunal Kumar,
Joint Secretary & Mission Director,
Smart Cities Mission

Finally, BHC also forged connections between each of our partner cities. We held study tours in [Indore](#) and [Makassar](#) with officials from each city so that they could learn from each other's successes. Examples of the cross-city learning this created are the spread of the healthy alley concept from Makassar to Indore, and interest from Makassar in Indore's landfill mitigation work. When the COVID-19 pandemic made travel impossible, BHC pivoted to holding virtual exchanges, and developed publications highlighting those successes (see our City Knowledge Exchange Series for [Da Nang](#), [Indore](#), and [Makassar](#)).



Participants in the BHC study tour in Makassar learn about a community-managed waste water system.
Photo credit: Daniel Peniston, JSI

Testing Practical Applications of Systems Thinking

Cities are complex and dynamic, which makes it difficult to pinpoint the most effective interventions for healthy urban planning. BHC found that systems thinking, which is a way to investigate patterns and interactions across a system (like a city), is a better approach for the urban context than a linear, traditional program approach.

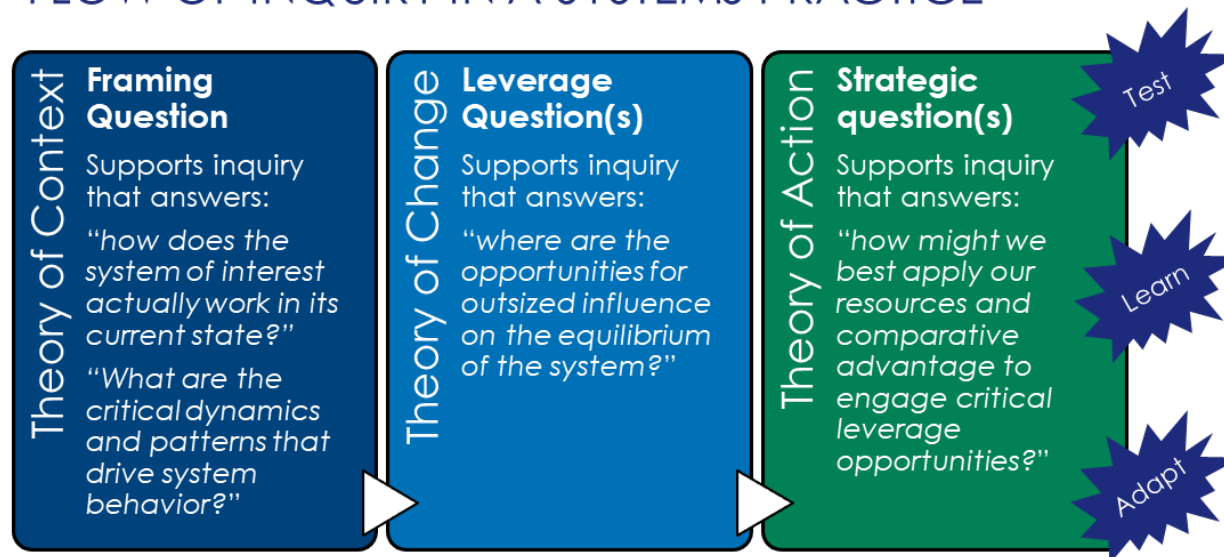
BHC used a systems thinking approach to support city planners and administrators in their relationships with citizens and CSOs to create traceable, transparent, and collaborative policy initiatives. In each of our cities, BHC and our partner, Engaging Inquiry, facilitated stakeholders through a three-phase systems mapping exercise. The objective was to create a common goal for

all stakeholders and to develop a map to illustrate how all of this information is connected. Prior to this project, use of these maps had not been tested for a system as large and complex as a city; BHC pioneered the use of this tool for use in pragmatic urban planning.

Each series of workshops and data analysis took one to two years, and included the Smart City governing body and a wide range of stakeholders and citizen groups including local government officials, CSOs, the private sector, academia, and others. The diagram below describes this process in more detail.

Figure 3. Systems Mapping Stages

FLOW OF INQUIRY IN A SYSTEMS PRACTICE



Source: Engaging Inquiry

"It is a complex approach for urban planning, but certainly this is a new way of looking and **analyzing** holistically a system. We will use this as a tool for planning health projects in the **future**."

– Rishav Gupta, Indore Smart City CEO

The result of this process was a "live" systems map that BHC continued to update as the context changed and the project learned more through other activities and stakeholders. These dynamic systems maps documented the context, leverage points, and recommended corrective actions (see the publications list in Annex 1 for map links). BHC also trained city officials on how to use the platform that hosts the maps (Kumu) so that they can "own" and update the maps going forward.

Systems thinking can be opaque and hard to apply in real life. One indication that BHC's approach helped make these concepts more useful for city planners came from the Smart City Mission in Delhi. After learning about BHC's work, they asked for tutorials on systems thinking and mapping, and have since formally requested that the USAID Mission support rolling out this training to all Indian Administrative Service leadership candidates for Smart Cities across India. This [commentary](#) also outlines BHC partner city experiences with this approach.

The maps helped BHC synthesize key findings across each city, and to develop Healthy City Action Plans for [Indore](#) and [Makassar](#), and a more streamlined recommendation

document for [Da Nang](#). These plans include evidence-based opportunities and their estimated costs for the city, funders, and the private sector to put into action. Because city departments and other stakeholders were the primary contributors to the plans, they are ready and willing to continue the work BHC started. In Kathmandu, BHC's mandate was to provide a plan for implementation of the Kathmandu Valley Air Quality Management Action Plan. We used the same systems thinking approach to produce this [municipal-level report](#). BHC's work contributed to the learning on how air pollutants affect the health of mothers and children. Excerpts from all four plans are below.

Figure 4. BHC Healthy City Actions and Recommendations

Indore Multisector Healthy City Coherent Actions



Makassar Multisector Healthy City Coherent Actions



Sustaining municipal support for the goal of a healthy Makassar



Leading the way on a circular economy



Creating a culture of data for health



Creating a more water-resilient city



Growing a healthier next generation of citizens



Encouraging healthy lifestyles for NCD prevention

Da Nang Multisector Healthy City Suggested Actions



Developing mobile applications to support utilization and improvement of clean/green initiatives



Pursuing innovative approaches to sustainable development through public private partnerships



Ensuring the accessibility of engagement for special groups in all initiatives



Leveraging the power of youth to improve community health

Kathmandu Municipal Actions for Air Quality

In Kathmandu, BHC helped identify which existing actions in the Kathmandu Valley Air Quality Management Action Plan could be taken at the Municipal level. BHC identified 22 activities across these 8 areas:



Vehicle emissions and traffic management



Infrastructure development



Greenery promotion



Brick kilns



Household, hospital, factory, and agricultural pollution



Policy and legal structures



Public awareness



Data and research

City officials in Makassar, in particular, took to the systems approach. The City Planning and Development Agency (Bappeda) asked BHC to [facilitate systems thinking trainings](#) to improve the transparency and efficiency of musrenbang (the bottom-up process they use for gathering community input on government long-term workplanning). These trainings provided both information on using a systems approach and specific tools and guidance on how to use that approach to define workplan priorities from the often overwhelming amount of feedback given by community members. This process can be explained and shared with the community

afterward, so they know why some suggestions were funded while others were not, and how they align with multisector city goals. In addition, Bappeda [integrated](#) the final BHC Healthy City Action Plan recommendations into their one-year and five-year workplans, which help to define spending and implementation for the municipality.

Developing Schools as a Hub for Multisector Integration

Schools are ideal settings for promoting healthy behaviors, which cut across sectors like health, nutrition, waste management, environmental health, and others. Teachers and students can be ideal co-creation partners to design innovative, effective interventions. In addition, preparing students to solve problems in healthy and sustainable ways will lead to a healthier and more resilient future for themselves and their communities. In Indore, Makassar, and Da Nang, BHC worked through schools, teachers, and students to increase health-promoting practices, and create clean, safe, and sustainable environments.

In Da Nang, BHC worked with the Education Department, the Youth Union, and two primary schools to develop and pilot the Waste-free Schools (WFS) program. This multisector activity helped to integrate food safety, waste management, and environmental health concepts for primary school students, all captured in the final WFS [training manual](#). As part of the program, BHC co-designed a waste bin with students, which served as an educational, practical, and fun way for students to take part in recycling and composting.

In Makassar, BHC and Bappeda co-hosted workshops with government departments and local NGOs on circular waste practices, specifically [ecobricking and composting](#), at Barrang Lompo Island high school. The goal was to decrease the amount of waste that ends up in the landfill by finding alternate uses for that waste. In addition to high



Students make ecobricks in Barrang Lompo Island, Makassar (top, IOM). Waste-free Schools bin in Da Nang (bottom, East Meets West Foundation).

school students, local farming groups and waste management CSOs also attended the workshop so they could better understand the reuse opportunities for waste, including urban farming. This workshop coincided with [nutrition trainings](#) on the island, in order to connect efforts between food security, nutrition, and waste management. The workshops also supported the action focused on the circular economy in BHC's Makassar Healthy City Action Plan.

In Indore, BHC conducted [Health Promoting Schools](#) (HPS) assessments, [trainings](#) for 228 teacher advocates and student ambassadors, and follow up for all middle, high, and higher secondary government schools. HPS is a multisector concept, first defined by the World Health Organization as a school that “constantly strengthens its

capacity as a healthy setting for living, learning and working.” To do this, schools must meet requirements relating to healthy school policies, healthy physical and social environments, links with the community, competencies for healthy living, and health care and promotion services. BHC helped teachers understand how to teach these concepts, [assessed](#) their current capacity, provided feedback on how to address the identified gaps, developed [teacher training guidelines](#) and an [activity manual](#), and established a Health Promotion Corner in each school. BHC also worked with the Indore multisector Smart Health Working Group to figure out ways to support schools on the needed improvements to achieve HPS status.

Teachers participate in a Health Promoting Schools training in Indore (left, Neeraj Mishra, JSIPL). A Health Promotion Corner in Indore (right, Damodar Bachani, JSIPL).



Improving Environmental Health Takes Multisector Action

Cities across South and Southeast Asia struggle with common and intersecting challenges (e.g., sanitation, waste management, and air pollution) that negatively affect health outcomes. While BHC was not originally tasked with addressing these issues, our systems mapping process quickly highlighted how important these environmental health issues were as social determinants of health in our partner cities. Looking across BHC's work highlights how the health of the environment drives urban health outcomes:

- **Air pollution:** BHC [found](#) that higher levels of PM_{2.5} air pollution correlated with higher incidence of nose, throat, and breathing problems, eye irritation, and skin problems in Indore.
- **Waste, wastewater, and flooding:** BHC found that skin diseases were most likely to occur during floods in one low-lying Makassar community, in part because sewers often overflowed into households during these floods. Three child deaths also occurred in the first year of BHC's work in Indore, after children fell into an [open, flooded drain](#) in one informal settlement.
- **Lack of green spaces:** There are fewer parks in informal settlements in Indore, compared to formal residential areas. BHC [found](#) that where there are parks, people spent more time doing recreational physical activity.



DATA-DRIVEN DECISION-MAKING

Key Accomplishments

- Co-developed an integrated data system with University of Oslo, helping the city of Makassar to better analyze their health and other data and make informed planning decisions.
- Advised two cities to revise and update their multisector Healthy City indicator lists.
- Assessed and improved citizen reporting systems (CRS) in three cities. Improved reporting and resolution rates in Indore, and reporting rates in Da Nang. Trained 62 call center CRS operators in Makassar to improve resolution rates.
- Conducted 15 demand-driven analytical reports and briefs, feeding data to cities on BHC activities and strengthening the evidence base of the systems maps.
- Published eight journal articles to broaden the global knowledge base for healthy urban planning.
- Developed a food safety app and website in Da Nang.
- Integrated real-time air quality data into Indore's central data dashboard.

Generating Data for Informed Decisions

Everyone involved in healthy urban planning needs high-quality data to make informed decisions and turn multisector planning into action. They also need the skills to use that data once it is available. That is why BHC identified data for decision-making as one of the three core values of healthy urban planning.

Figure 5. Four Characteristics of Useful Data for Decision-Making

Having data is not enough to make informed decisions. In order for trained staff to use them, data must also be:



High Quality

Data must be accurate, complete, reliable, and consistent.



Timely

Data must be produced at the right time in the decision making cycle.



Accessible

Data must be available in the right places where decision makers can access them.



Usable

Decision makers must be able to easily read, understand, and navigate the data.

BHC led by example. Early on, the project produced digestible, relevant data to inform policy and action such as health-at-a-glance profiles for [Da Nang](#), [Indore](#), and [Makassar](#); a [rapid assessment](#) of urban primary health centers in Indore; and a [policy brief](#) on low-cost air quality sensors in Indore. Over time, BHC's work on this core value grew to include information systems strengthening, community data literacy, integration of data into yearly workplans, and data visualization.

Integrating Data across Sectors

Like people, data systems need to work across sectors and include multiple perspectives to be effective. One way BHC supported data for decision-making was by connecting databases from different sources, and providing a way to visualize them together. In other words, creating an integrated data system.

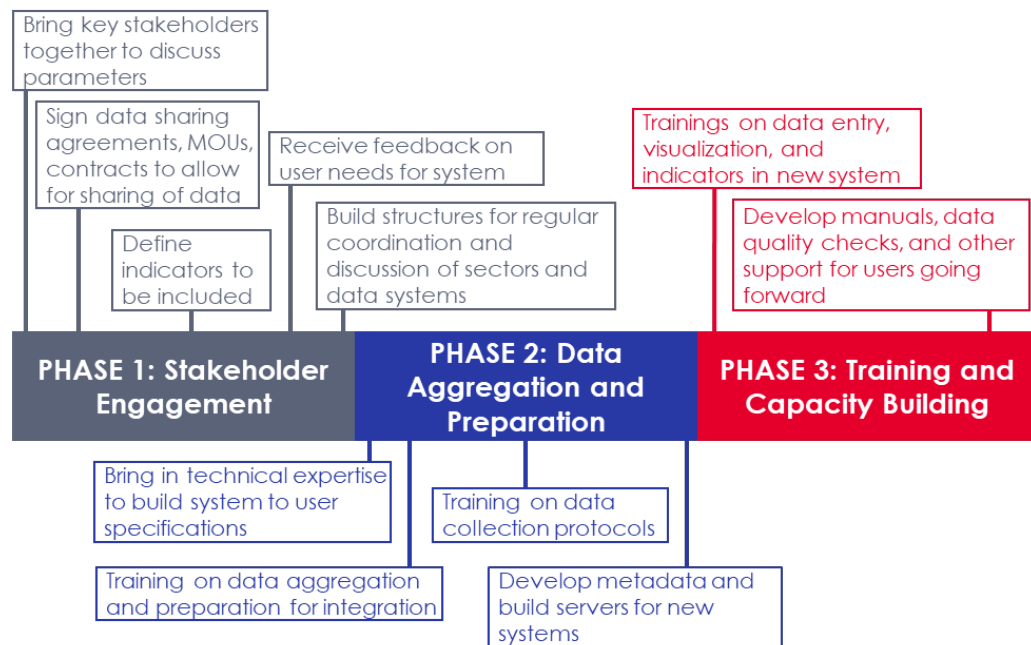
This is a complicated process, and most of it happens before you can even think about the specific data you want to include. Figure 6 shows the scale of BHC's data integration efforts in Makassar. BHC, with the University of

"With **integrated data** and cross-sector analysis of data, we can understand the situation more comprehensively. This helps us make policies that **effectively** and **efficiently** use our resources."

– Mohammad Ramdhan Pomanto,
Mayor of Makassar

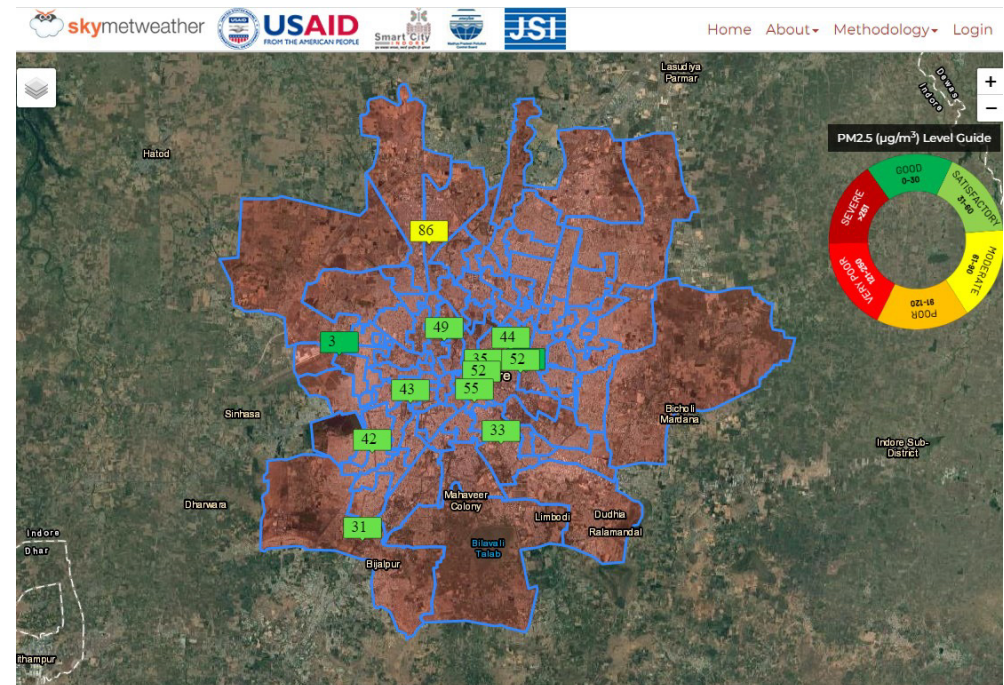
Oslo, supported the city to turn the existing DHIS-2 software into a multisector integrated system that can visualize the city's Healthy City indicator list. BHC trained 128 government workers, including community health workers, to use the system.

Figure 6. What it Takes to Integrate Data



Similarly, in Indore, BHC supported ISCDL to integrate real-time air quality data into its central data dashboard (see Figure 7).

Figure 7. BHC's Indore Air Quality Data Dashboard



Improving Citizen Reporting Systems

CRS are critical links between the community and city leaders. A city government is responsible for providing public services and infrastructure, but it is difficult for a

Figure 8. Infographics Promoting CRS in Da Nang and Makassar

city government to be aware of every problem. Citizens are excellent sources of information about real-time community problems. With CRS apps and phone numbers, people can quickly report a broken streetlight, pothole, or clogged drain directly to the government. Ideally, the government can fix these problems

immediately. This feedback loop between citizens and city leaders gives citizens a greater voice and leads to more equitable service allocation.

BHC assessed CRS in Da Nang, [Indore](#), and [Makassar](#), and implemented [awareness campaigns](#) focused on marginalized communities. BHC then trained 62 Call Center 112 operators in [Makassar](#) to improve their responses to complaints. The trainings focused on strengthening operator capacity to communicate with callers and city departments, improving operator use of the Call Center 112 system, and linking Call Center 112 into the new multisector data integration system.



Improving Demand-driven Data Collection, Reporting, and Visualization

As BHC formed strong partnerships with city officials and proved its value in supporting data for decision-making, we received additional requests to conduct data-related activities. These data and analysis had real impacts on city workplans. Our [Noncommunicable Disease Risk Factor and Environment Survey](#) results helped to move forward compliance with Cigarettes and Other Tobacco Products Act regulations in Indore. Also in Indore, our [road](#) and [pedestrian](#) safety surveys informed city planning for cycling lanes. Finally, in Da Nang, our [food safety](#) survey led to further funding to develop a food safety app and other food safety information system activities.

Additional data-related activities included:

- A rapid feedback survey on [food safety in Indore](#).
- Assessing the functionality of [urban primary health centers](#) in Indore.
- Developing and disseminating a food safety app ([iOS](#) and [Android](#)) and two [food safety websites](#) in Da Nang.
- Collecting data and publishing briefs on the status of child nutrition and community nutrition support systems in [Indore](#) and [Makassar](#).

Expanding the Global Knowledge Base on Healthy Urban Planning

Even the best approaches, methodologies, and interventions will be forgotten if they are not documented. BHC aimed to report several of our more innovative or impactful activities in academic journals to ensure they are searchable and discoverable in perpetuity. BHC developed reports and journal articles with the global debate on research inequity in mind.

BHC published these and other results in the following journal articles:

- *Collection of Articles on Systems Approach in Journal of Urban Health*
 - [Healthier Cities through Systems Thinking: Practical Considerations for City Leaders](#)
 - [Participatory Systems Mapping for Municipal Prioritization and Planning](#)
 - [Designing for a Healthier Indore, India](#)
 - [Designing for a Healthier Makassar, Indonesia](#)
 - [Bringing Sectors Together in Da Nang, Vietnam](#)
- [Does Neighborhood Status Affect Access to a Healthy Built Environment?](#), Pre-print
- [Engaging Citizens Via Journey Maps to Address Urban Health Issues](#), *Environmental Health Insights*
- [Exploring urban health inequities: The example of non-communicable disease prevention in Indore, India](#), *Cities & Health*
- [Noncommunicable disease risk profile of urban women in Indore city, India](#), *International Journal of Noncommunicable Diseases*
- [Reducing Air Pollution - Towards making Indore a Smart, Clean, and Healthy City](#), *Journal of Advanced Research in Alternative Energy, Environment and Ecology*

Increasing Skills for Data Literacy, Use, and Visualization

Improving data for decision-making is equally dependent on human resources and data systems. Without giving people the knowledge, interest, and competency to spot good versus bad data and use it persuasively, even the best data can be wasted.

BHC worked on several fronts to improve human resources for data literacy, use, and visualization through skills building activities:

- Facilitated data sharing and use agreements across sectors.
- Trained government staff on data quality, use, and visualization.
- Trained call center staff to better read and respond to complaint data.
- Created standard operating procedures to improve complaint data categorization and routing for the Makassar CRS.
- Trained citizen enumerators and CSOs on basic data literacy, visualization, and sharing, as well as data collection ethics.
- Worked with communities to understand the results of surveys and air sensor data in their area, and facilitated citizen interpretation and use of those data for advocacy.



CITIZEN ENGAGEMENT

Key Accomplishments

- Engaged 660 community members in participatory studies to affect 369,460 residents.
- 33 community organizations worked with BHC on project initiatives.
- Trained 3,780 people (60 percent women) on a wide range of urban health-related topics.
- Installed 20 low-cost air quality sensors in Indore, and transferred ownership to city officials.
- Created a cadre of Clean Air Guides in Indore to raise awareness about the effects of air quality on health in their communities, document causes of air pollution at the neighborhood level, and work with government officials to address those causes.
- Fulfilled a community request in Indore to train low-income women on sustainable livelihoods. They chose sewing cloth bags.
- Developed a communications campaign in Kathmandu to decrease open burning.
- Developed 10,000 square feet of cycle pathways in Indore.
- Identified 200,000 square feet of unused spaces in Indore to develop child-friendly parks and green spaces.

Using Journey Maps to Connect Communities and City Officials

While systems maps allow us to see city-level patterns, journey maps helped BHC understand the same issues at the neighborhood level. With journey maps, BHC documented the experiences of citizens trying to overcome a service delivery challenge. BHC identified these challenges during the first year of activities in each city, and followed up quarterly to document changes and facilitate dialogue between community members and city officials.

BHC trained community members to develop these journey maps themselves, and they will continue to use them in grassroots advocacy. This support helped align municipal planning with community priorities such as safe water, clean air, and traffic safety. See the publications list in Annex 1 for links to all 11 journey maps.

Empowering Citizens to Define Needs and Solutions

City residents are experts in their living conditions, and if given the opportunity, can provide creative solutions to their city's greatest challenges. However, certain groups are often excluded from the urban planning process, which causes greater inequity. This is why BHC identified citizen empowerment as one of the three core values of healthy urban planning.

"Citizens are the main stakeholders. They are integral to the whole process as we are planning for them and their needs."

– Rishav Gupta, Indore Smart City CEO

BHC collaborated with marginalized communities in all four of its partner cities throughout the project to co-create activities. These included women, youth, individuals with low income, residents of informal settlements, people with disabilities, and the geographically isolated.

The goal of this work was to embed residents into the decision-making and data generation process. In addition, one of our data principles was to share findings with the residents and communities who provided the information. The research questions and priorities that the communities set were often related to multisector, systems level issues, bringing all three core values full circle.

BHC engaged 660 community members in participatory studies to affect 369,460 residents.

BHC's participatory studies led to meaningful, citizen-driven changes to the urban environment:

- 3** Anganwadi centers renovated.
- 10,000** INR earned by women trained on eco-friendly sewing.
- 5** kilometers of paved pedestrian pathways repaired.
- 10,000** square feet of cycle pathways built.
- 20** clean air rallies held to spur air quality action.
- Use of **biofuels banned** in food streets.
- Waste burning banned** in key neighborhoods.
- Trash disposal** on vacant land stopped in key neighborhoods.

Indore Environmental Health Study

Through BHC's health needs assessment and the journey maps in Indore, we noted several overlapping environmental health issues that overwhelmingly affected lower income communities. As a result, BHC worked with CSO Centre for Urban and Regional Excellence to 1) work with women's groups in eight informal settlements to define the [key research questions](#) relevant to community health in these areas, and 2) train 164 community enumerators to [collect survey data](#) related to these questions. As a third step, BHC went back to these communities, engaging around 450 residents (primarily women), to discuss the resulting data and record each community's priorities for intervention. All participants were encouraged to advocate for their needs, and were assured that their voices would be heard and given a response. Indeed, the result of this work was the piloting of Kaya Kalp (described later on in this section).

"This is the **first time** that an organization has **come back to us**. Mostly people come, ask questions and go. Nobody comes back to work for any cause."

– Participatory Research Participant, Indore

Indore Community Participation in Air Pollution Mitigation

Also in Indore, BHC conducted a [participatory study](#) looking at community action to reduce air pollution. Air pollution was identified within the systems mapping process as a key determinant of a citizen's health, yet awareness of this issue was low in Indore, meaning communities may not prioritize it as an issue. BHC tackled this issue by creating a strategic community action activity that combined the power of low-cost air quality sensors with human resources in the form of Clean Air Guides, who were trained to read and interpret the air sensor data to increase community awareness, advocacy, and city action. This type of work is a powerful, affordable way to expand the monitoring network for air pollution across cities, identify pollution sources that bother residents the most, mobilize residents and city authorities to act on pollution issues, and create citywide awareness. As the project ended, BHC handed ownership of the sensor network over to the city and the Confederation of Indian Industries (CII). CII will continue our air quality approach of using sensor data in monitoring air quality, engaging community volunteers and expanding the sensor network (30 more sensors were added by CII). In addition, BHC also shared sensor data and signed a memorandum of understanding with the USAID-funded Clean Air Catalyst project, who provided input to the Indore Healthy City Action Plan and will add three sensors of their own to the Indore context.



A community enumerator collects data in Indore (top left, CURE). Community members discuss their data and priorities during a data walk in Indore (top center, Alsa Bakhtawar, JSIPL).

Low-cost air quality sensor (top right, Neeraj Mishra, JSIPL). Clean Air Guides organize and participate in a community air pollution awareness rally (bottom left, Damodar Bachani, JSIPL).

Makassar Community-based Waste and Water Management Study

After the journey and systems mapping efforts identified solid waste and waste water as major determinants of health in Makassar, BHC partnered with local CSO LSKP to help complete a [participatory study](#) on these issues in the Maccini Sombala neighborhood, and identify local solutions to these issues. Residents living in this area took part in data collection, analysis, identification of gaps, and prioritization of solutions. The final results were shared back to the residents through data walks. Based on the results of this study, Smart City Makassar, the Mayor's office, and organizations operating community improvement programs, now have useful citizen-led feedback on ways to reduce waste and flooding, and create sustainable circular economies for waste in Maccini Sombala and similar neighborhoods across the city. BHC presented these results to the Mayor in July 2022, and to two other US government funded projects also working on environmental issues in Makassar, and made the specific request that they take up support for these locally-led solutions.

"We are happy to be **invited back** to hear the results of the research. Frankly, this is the **first time** we have come across a study that conveys the results of its research to residents."

– Mrs. M, Resident of RW 4,
Maccini Sombala, Makassar

Training Women for Greener Livelihoods

During community data collection for our environmental health study in Indore, BHC heard that COVID-19 severely affected the income of community residents, especially women. These women advocated for skills-based, resilient income generating options. In response, BHC provided [livelihoods training](#) for 116 women and girls (ages 18 to 45) on sewing eco-friendly cloth bags. This aligned with the beginning of Indore's "Say No to Single Use Plastic" campaign. So far, this group has earned INR 10,000 (US\$ 122; a female day laborer in India typically makes US\$ 3.65 per day).

Women display the first cloth bags sewn after the BHC livelihoods training in Indore.
Photo credit: CURE.



Piloting Healthy City Actions through Kaya Kalp

BHC piloted implementation of the Indore Healthy City Action Plan in two informal settlements with an initiative called [Kaya Kalp](#), which means rejuvenation. Using the results from the environmental health study to test the equity-based, data-driven implementation plan, this initiative tested the practical aspects of BHC's recommendations for making Indore a healthier city, and as a model for other neighborhoods. The USAID-funded Samagra Project is expanding the initiative into six additional settlements.

Residents in the two pilot communities prioritized fixing the lack of child-friendly environments. BHC partnered with the CSO Basix and the Indore city government to respond to community priorities and create safe play spaces, pedestrian areas, and bike lanes, and renovate two Anganwadi centers. Both Kaya Kalp communities incorporated the idea of a circular economy by safely



Anganwadi center in Indore, before (left) and after (right) BHC improvements. Playground (right) and bike lane (top right) developed by BHC. Photo credits: Basix.

reusing waste material collected from the community to integrate into the parks and playgrounds. BHC supported the development of a 10,000 square foot cycle pathway that connects community residents to public transport. BHC also supported identifying 200,000 square feet of unused spaces to develop child-friendly parks and green spaces, increasing opportunities for nature play and sensory stimulation.

Providing City-wide Media Messaging for Behavior Change

After discussion with city officials on key issues, BHC crafted mixed media messages to change behaviors on environmental health issues and use of certain systems. Regarding environmental health, BHC worked with a Delhi-based illustrator to create a series on how the environment can affect maternal and child health, covering community awareness and solutions to [air pollution](#), [food safety](#), and [waste management](#). In Kathmandu, BHC developed a 30 second [animated video](#) on the risks of open burning to residents, to be played at bus stands in the city. Also in Kathmandu, BHC provided [billboards](#) and [posters](#) to support the city's effort to curb open burning of waste.



Reducing, reusing (including composting), and recycling will decrease the waste produced.

Each person's efforts come together to improve the city's economy, environment, and the health of its citizens. So give your garbage new life!

Ensuring Equitable, Meaningful Participation

Participatory research is one of the few ways to truly develop relevant, inclusive solutions. Oftentimes, community members are only included in data collection, and then left out of the analysis, recommendation, and action stages of the work.

BHC co-created research with communities from start to finish in Indore and Makassar. Community members in informal settlements and lower-income areas helped to create the questionnaires used, collect the data, and assist with basic data cleaning. BHC then synthesized findings for each community and held town hall style meetings called “data walks” that allowed community members to share more context about the findings, help interpret the data, prioritize the recommendations, and brainstorm solutions. Completing this full cycle of participatory research allows citizens to use their own data to advocate for a healthier environment.

This work helped to support equitable implementation by:

- Surfacing issues of most importance to underserved communities, which may not have been heard before.
- Increasing the vote, or weight of priority, for those issues most of interest to underserved communities in civic and municipal workplanning and budgeting processes.
- Customizing intervention/operationalization of city-wide plans toward those priorities for those communities. This is what BHC means by a health equity approach, as a move away from “one size fits all,” which also ensures that scarce resources are spent only where they are needed, and not where they are *not* needed.



FINAL EVENTS

Da Nang

The BHC team in Da Nang held a virtual [closing workshop](#) on September 29, 2021 to summarize the project's accomplishments through presentations and a [video](#), and discuss the future of activities begun under the project. The event included 40 participants from city government departments, NGO and CSO partners, and BHC staff.

Indore

In order to celebrate the successful end of activities, BHC co-hosted [a project closeout and dissemination event](#) with ISCDL in Indore on March 26, 2022. The objectives of the event were to: (1) share what BHC's partnership with city leadership accomplished during the last five years; (2) formally hand over BHC's Proposed Healthy Indore Action Plan to the city administration; and (3) express thanks to all parties who supported the project. The event was attended by 106 people from across key stakeholder groups who had participated in BHC activities since 2017. A full recording of the event is available [here](#).

Kathmandu

The BHC team in Kathmandu held two closing events. The first, a closing workshop with stakeholders and the general public, took place on September 29, 2021. The second event, a debrief presentation with the USAID Mission, took place on September 30, 2021.

Makassar

BHC collaborated with Bappeda in Makassar to hold a project closeout event titled "[Smart and Healthy City Conference: To Build a Healthy and Livable World-Class City](#)" on May 18-19, 2022, and launch the Healthy City Multisectoral Data Integration System (Sehattami). The conference took place over two days. The first day was a hybrid in-person and virtual information sharing event attended by 69 participants from different sectors including key government entities (Ministry of Information and Communication, Mayor of Makassar, Pusdatin, Ministry of Health), USAID, UN agencies, NGOs, CSOs, the private sector, and academic institutions. In addition, delegations from city or municipality members of the Smart and Healthy Cities Network attended, including Jakarta, Pare-Pare, Maros, Takalar, and Gowa. On the second day of the conference, BHC conducted a field visit to Barrang Lompo Island with a smaller group of 31 people to share key project achievements.

Global

On July 29th, 2022 JSI celebrated BHC's accomplishments with the Building Healthy Cities: Project Accomplishments and Learning Exhibit. Fifty-five people attended the museum-style exhibit, including implementing partners, funders, and BHC partners. The in-person event was adapted to an [online version](#), and brings viewers through a virtual multimedia exhibit. To date, 218 viewers have visited the virtual exhibit.



Final event participants listen to speeches (left, Kim Farnham Egan, JSI) and view the exhibits (top center and right, Lexi Shetty, JSI). An example ecobrick wall (center, Kim Farnham Egan, JSI). The BHC JSI and USAID team (bottom right, Lexi Shetty, JSI).



ANNEX 1: LIST OF PUBLICATIONS

Journal Articles

- *Collection of Articles on Systems Approach in Journal of Urban Health*
 - [Healthier Cities through Systems Thinking: Practical Considerations for City Leaders](#)
 - [Participatory Systems Mapping for Municipal Prioritization and Planning](#)
 - [Designing for a Healthier Indore, India: Participatory Systems Mapping](#)
 - [Designing for a Healthier Makassar, Indonesia: Participatory Systems Mapping](#)
 - [Bringing Sectors Together in Da Nang, Vietnam: Participatory Systems Mapping](#)
- [Does Neighborhood Status Affect Access to a Healthy Built Environment?, Pre-print](#)
- [Engaging Citizens Via Journey Maps to Address Urban Health Issues, Environmental Health Insights](#)
- [Exploring urban health inequities: The example of non-communicable disease prevention in Indore, India, Cities & Health](#)
- [Noncommunicable disease risk profile of urban women in Indore city, India, International Journal of Noncommunicable Diseases](#)
- [Reducing Air Pollution - Towards making Indore a Smart, Clean, and Healthy City, Journal of Advanced Research in Alternative Energy, Environment and Ecology](#)

Global Publications

End-of-project event: [Project Accomplishments and Learning Virtual Exhibit](#)

Blogs

- [A Good Planet is Hard to Find: Celebrating Earth Day 2021](#)
- [Building Smart and Healthy Cities in Asia: Celebrating 5 years of improving the social determinants of health in urban contexts](#)
- [Could Public Private Partnerships Improve Health Outcomes in Developing Countries?](#)
- [How equity in citizen participation can improve the health of cities](#)
- [How Public-Private Partnerships Can Mitigate Urban Health Challenges](#)
- Indore Study Tour: [BHC Partner Shares How It Became India's Cleanest City](#)
- Makassar Study Tour: [Hardware and Heartware: Two Approaches to a Smarter, Healthier City](#)
- [Prioritizing Health in Our Cities](#)
- [Prioritizing Sustainable Solutions to Urban Health Challenges](#)
- [Solving Entrenched Maternal and Child Health Problems in Urban Settings](#)

- [Supporting Vulnerable Populations in India, Indonesia, and Vietnam during COVID-19](#)
- [Urban Health in the Time of COVID-19](#)
- [Why Citizen Feedback is Important for Healthy Urban Planning](#)

Briefs

- [Building Healthy Cities](#) two-pager
- [City Knowledge Exchange Series: Promoting Healthy Behaviors in Makassar](#)
- [City Knowledge Exchange Series: Supporting Affordable Health Care in Da Nang](#)
- [City Knowledge Exchange Series: Turning Waste into Wonder in Indore](#)
- [Clean Air, Healthy People: A Citizen-led Approach to Improving Urban Air Quality](#)
- [Public-Private Partnerships for Urban Health Brief 1: A Primer of the Benefits, Challenges, and Opportunities](#)
- [Public-Private Partnerships for Urban Health Brief 2: Guidance for Local Leaders](#)

Infographics and Videos

- [BHC Business Card](#)
- [BHC Introduction](#) (video)
- [Designing for Cleaner Air Webinar](#) (video)
- Food Safety for Mothers and Children (video available in [Bahasa](#), [English](#), [Hindi](#), and [Vietnamese](#))
- Graphic Novel: Waste Management and Its Impact on People and Environment (available in [Bahasa](#), [English](#), [Hindi](#), and [Vietnamese](#))

- How Air Pollution Impacts Maternal and Child Health (video available in [Bahasa](#), [English](#), [Hindi](#), [Nepali](#), and [Vietnamese](#))
- [Joint Webinar on Designing Cities for Vulnerable Populations](#) (video)
- [Joint Webinar on Land Use Implications of Building a Healthy City](#) (video)
- [Joint Webinar on Water, Welfare, and Health in Urban Settings](#) (video)
- [Participatory Systems Mapping: Implications for Improving Urban Maternal and Child Outcomes](#) (video)
- [Partnerships and Stakeholder Map](#)
- [Recognizing World Cities Day: What is healthy urban planning?](#) (Facebook live recording)
- [Smart Cities, Healthy Cities: Scope and Opportunities Leadership Roundtable](#) (video)
- The Benefits of Investing in Urban Health (video available in [Bahasa](#), [English](#), and [Hindi](#))
- [Webinar on Multisector Integrated Data Management](#) (video)
- [World Environmental Health Day with the Building Healthy Cities Project](#) (Facebook live recording)

Publications from Indore, India

Assessment and Research Reports

- [Assessment Report on Functionality of Urban Primary Health Centers of Indore City](#)
- [Assessment of Citizen Reporting Systems in Indore City](#)
- [Community Participation in Air Pollution Mitigation](#)
- [Community Participation in Air Pollution Mitigation: Annex Supplement](#)
- [Community Participation in Air Pollution Mitigation: Executive Summary](#)
- [Data Use and Access Assessment](#)
- [Health Needs Assessment](#)
- [Noncommunicable Disease Risk Factor & Environment Survey Fact Sheet](#)
- [Noncommunicable Disease Risk Factor & Environment Survey Results Dissemination Workshop Report](#)
- [Participatory Research Report: Community Data Walks](#)
- [Participatory Research Report: Phase I Qualitative Results](#)
- [Political Economy Analysis](#)

Blogs

- [A Moving Target: The variability in air quality and how to respond](#)
- [How Community Partners are the Key to Improving Air Quality and Mitigating Climate Change](#)
- [How COVID-19 Lockdowns Improved Indore's Air Quality](#)

- [Starting at School: How BHC is promoting health to youth in Indore](#)
- [The Air Pollution We Can and Can't See](#)

Briefs

- [Citizen Spotlight: Food Safety in Indore](#)
- [Citizen Spotlight: Pedestrian Safety in Indore](#)
- [Citizen Spotlight: Road Safety in Indore](#)
- [Health-at-a-Glance City Profile](#)
- [Journey Map Series: Access to Health Services](#)
- [Journey Map Series: Air Pollution](#)
- [Journey Map Series: Citizen Participation](#)
- [Journey Map Series: The Forgotten Bridge](#)
- [Policy Brief: Low-Cost Real-Time Sensors for Air Quality Monitoring](#)
- [Status of Child Nutrition and Community Nutrition Support Systems: Indore](#)
- Urban Health and Wellbeing Programme, Policy Briefs Volume 2: [Developing Health-Promoting Schools: An Initiative in Government Schools of Indore City, India](#)
- Urban Health and Wellbeing Programme, Policy Briefs Volume 3: [Effective execution of provisions under Cigarettes and Other Tobacco Products Act \(COTPA\) through multi-sectoral approach to reduce use of tobacco in Indore city, India](#)

Infographics and Videos

- [Air Quality Across Indore, India](#) (video)
- [Air Quality in Indore, India: Data from BHC's Clean Air Guide Study](#) (video)
- [BHC Indore Close Out Event](#) (video)

- [Building Healthy Cities: Clean Healthy Smart Indore](#) (video)
- [Healthy City Infographic](#)
- [Healthy Systems for Wastewater Management in Indore](#) (video)
- Interactive Infographic: [Testing Healthy Urban Planning Approaches in Indore](#)

Systems Mapping

- [Data Validation & Systems Mapping Workshop Report](#)
- [Systems Map Brief: Indore](#)
- Systems Context Map ([English](#) and [Hindi](#))
- [Leverage Workshop Report](#)
- [Systems Leverage Map](#)
- [Theory of Action Workshop Report](#)
- Kumu Platform Tour (video available in [English](#) and [Hindi](#))
- [Healthy City Action Plan](#)

Technical Reports

- [Health Promoting Schools Activity Guidelines for Teachers](#)
- [Health Promoting Schools Baseline Assessment Report](#)
- [Health Promoting Schools Baseline Assessment Report Annex Supplement](#)
- [Health Promoting Schools Development](#)
- [Health Promoting Schools Pilot Teacher Training](#)
- [Health Promoting Schools Teachers Training Guidelines](#)

- The Power of Cities: Tackling Noncommunicable Diseases and Road Traffic Injuries, [Indore, India Case Study](#)

Workshop Reports

- [Clean Air Guide Refresher Training](#)
- [Livelihoods Training](#)
- [Project Closeout and Dissemination Event](#)
- [Sensitization on Food Safety and Healthy Foods for Members of Food Handlers' Associations](#)
- [Training and Capacity Building for City Officers on the Cigarettes and Other Tobacco Products Act](#)

Publications from Makassar, Indonesia

Assessment and Research Reports

- [Assessment of Citizen Reporting Systems in Makassar](#)
- [Community-based Waste and Water Management Study](#)
- [Community-based Waste and Water Management Study: Executive Summary](#)
- [Data Use and Access Assessment](#)
- [Health Needs Assessment](#)
- [Political Economy Analysis](#)

Blogs

- [Community Participation in Strengthening Waste Management Systems in Makassar, Indonesia](#)
- [Having a Say in Government: How residents of Makassar get involved in city planning](#)

Briefs

- [Data Brief: Puskesmas Data Integration Assessment](#)
- [Health-at-a-Glance City Profile](#)
- [Journey Map Series: Citizen Reporting Systems](#)
- [Journey Map Series: Health Services](#)
- [Journey Map Series: It's All Connected](#)
- [Journey Map Series: Public Safety](#)
- [Status of Child Nutrition and Community Nutrition Support Systems: Makassar](#)

Infographics and Videos

- [Getting to Know Makassar's Call Center 112](#) (video)
- [Healthy City Infographic](#)

- [Healthy Systems for Wastewater Management in Makassar](#) (video)
- Interactive Infographic: [Testing Healthy Urban Planning Approaches in Makassar](#)
- [Waste Management in Barrang Lompo: Composting and EcoBricking](#) (video)

Systems Mapping

- [Systems Map Brief: Makassar](#)
- [Community Town Halls Workshop Report](#)
- Systems Context Map ([English](#) and [Bahasa](#))
- [Leverage Workshop Report](#)
- Systems Leverage Map ([English](#) and [Bahasa](#))
- [Theory of Action Workshop Report](#)
- [Kumu Platform Tour](#) (video)
- [Healthy City Action Plan](#)
- [Action Plan Integration Workshop](#)

Technical Reports

- [Multisector Data Integration Series: Phase 1 Summary](#)
- [Multisector Data Integration Series: Phase 2 Summary](#)
- [Multisector Data Integration Series: Phase 3 Summary](#)

Workshop Reports

- [Call Center 112 Reporting and Data Management Training](#)
- [Musrenbang Prioritization Training](#)
- [Project Closeout Smart and Healthy City Conference](#)
- [Training of Call Center 112 Call Takers](#)
- [Training on Infant and Young Child Feeding and Integrated Management of Acute Malnutrition](#)

Publications from Da Nang, Vietnam

Blogs

- [Charting a Route to Better Urban Health in Da Nang](#)

Briefs

- [Citizen Spotlight: Food Safety in Da Nang](#)
- [Health-at-a-Glance City Profile](#)
- [Journey Map Series: Air Quality at Tran Thi Ly Bridge](#)
- [Journey Map Series: Food Hygiene in Traditional Markets](#)
- [Journey Map Series: Wastewater Overflow to My Khe Beach](#)

Infographics and Videos

- [1022 Communications](#) (video)
- [BHC Da Nang Activities](#) (video)
- [Food Safety Education](#) (video)
- [Healthy City Infographic](#)
- [Healthy Systems for Wastewater Management in Da Nang](#) (video)
- [Impacts of Waste on Health](#) (video)
- Interactive Infographic: [Testing Healthy Urban Planning Approaches in Da Nang](#)
- [Waste-free Schools](#) (video)

Systems Mapping

- [Systems Map Brief: Da Nang](#)
- Systems Context Map ([English](#) and [Vietnamese](#))
- Systems Leverage Map ([English](#) and [Vietnamese](#))
- [Kumu Platform Tour](#) (video)

- [Systems Mapping Approach Summary Report](#)

Technical Reports and Tools

- [Food Safety Traceability Website](#)
- [Food Safety Information Website](#)
- TraceFood Food Safety App ([iOS](#) and [Android](#))
- [Waste-free Schools Handbook](#)

Workshop Reports

- [Closing Conference Report](#)
- [Economic Development Strategies for Young People with Disabilities](#)
- [Food Safety Meeting](#)
- [Solid Waste Management Meeting](#)
- [Waste Management and Food Safety Online Training](#)

Publications from Kathmandu, Nepal

Infographics and Videos

- How to Give Your Garbage New Life (video available in [English](#) and [Nepali](#))
- [Stop Open Burning and Reduce Air Pollution Flip Book](#)
- [Stop Open Burning Poster Campaign](#)

Systems Mapping

- Systems Context Map ([English](#) and [Nepali](#))
- [Systems Leverage Map](#)
- [Systems Mapping Approach Workshop Report](#)
- [Kumu Platform Tour](#) (video)
- [Kathmandu Implementation Plan: Municipal Actions for Air Quality in the Kathmandu Valley](#)

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BUILDING HEALTHY CITIES

