ERC Starting Grant 2023
Part B2

Section a. State-of-the-art and objectives

Background and conceptual framework

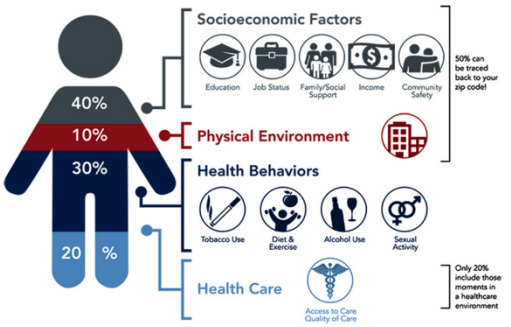
The wicked problem of health equity

Many and important advances have been made by medicine to improve peoples' lives. Yet, for over half a century, vast literature continues to document perpetuating health and health care disparities between populations[1–4]. The discourse on the causes of these disparities ranges from epigenetics and the biological pathways through which adverse social exposure contributes to disparate health outcomes, to the impact of social and structural differences produced by social systems far beyond health care[5–8]. The consistent challenge of health disparities is no surprise. Disparities are not the measurable differences between all possible groups or people, but rather those who are economically, socially, or environmentally disadvantaged because of characteristics such as race, socio-economic status, gender, geographic location, sexual identity, or disability[9]. As such, health disparities directly relate to values, not only those of social justice, but of equity[10]. Whitehead defined health inequity as "health differences that are avoidable, unnecessary and unjust"[11]. The understanding that measurable disparities in health and healthcare are interwoven with social values makes the path to attaining health equity a wicked problem to solve.

Originating in the disciplinary worlds of design and urban planning, Rittel and Webber coined in 1973 the term 'Wicked Problems' to draw attention to the complexities and challenges which social problems present. Wicked problems are defined through ten characteristics: (1) the problem is difficult to formulate; (2) there is no defined 'stop' or final solution; (3) solutions are not true or false but rather good or bad; (4) there is no immediate test to a wicked problem; (5) every attempt has consequences and counts; (6) there is not a set number of potential solutions; (7) every wicked problem is essentially unique; (8) every wicked problem is a symptom of another problem; (9) there are multiple explanations for the wicked problem; and (10) planners/designers/policy makers have no right to be wrong and must be fully responsible for their actions[12]. While societies have mastered solving technical and even scientific problems through a Newtonian mechanistic approach, they grapple with how to address social challenges in which goal-formation, problem definition and equity issues meet[13,14]. That is because values cannot be adjudicated and settled by merely 'more data' and systemic and interlinked problems cannot be solved independently through singular interventions or programs[15].

Interventions have been implemented over the years with the aim of reducing disparities and achieving health equity. The World Health Organization's call in 2008 to eliminate health inequities within a decade was incremental in moving from theory to action[16]. Many important interventions have shown success in reducing apparent health disparities in specific areas of care and or addressing specific social determinants of health such as housing or food insecurity[17]. Other interventions have had a minimal or even a detrimental effect and have widened existing gaps. Observing these interventions through the prism of 'wicked problems', may give us some insights to the mixed results in attaining the outcome of health equity as several shortcomings are detected. First, difficulties in formulating equity across multiple institutions, departments and organization levels have led to fragmented frameworks that fall short in their ability to translate equity[18]. Second, despite equity being a multi-layered problem, most interventions have focused on the patient individual level[19–22]. Third, interventions often target a specific health outcome such as cancer, diabetes, or cardiovascular disease without necessarily addressing cross-polination[23,24]. Fourth, interventions often have a 'stop' point with their sustainability remaining unclear[25]. Finally, intersectoral partners are deemed as crucial to address the structural determinants affecting health equity, such as housing or transportation, but their involvement is initiated and steered mainly by healthcare organizations, sometimes substituting community involvement by using proxies rather than direct communication[26,27].

Hand in hand? Municipalities and health equity



Municipal government has long been viewed as having a central role in the mesh fabric of actors that can advance health equity. The main reason for this being that many of the structural social determinants affecting over 50% of peoples' health, such as education, housing, access to healthy food or places to exercise are under the day-to-day responsibilities of municipalities[28,29]. Interestingly, with mass urbanization in the 19th century, public health and urban planning were linked within cities to prevent the outbreak of infectious diseases such as typhoid or cholera. However, the bio-medicalization of health and the specialization in medicine caused a disconnect in which health was externalized from everyday city life[30]. As cities continued to grow, inner mechanisms of social sorting propagated creating ethnic, socio-economic homogenous neighborhoods exacerbating a social gradient with determinantal effects on people's health outcomes[31,32]. Despite these determinantal effects, health was not re-integrated into cities' policies and planning[33,34].

Over the years, as health disparities perpetuated, different paradigms were developed in an attempt to link once again municipal government and health. Of these paradigms, the health social movement aspired to integrate health equity into all considerations of urban governance[35,36]. To link health equity to municipal governance, the health social movement initiated two intertwined approaches developed by the World Health Organization (WHO): Health in All Policies (HiAP) and the Healthy Cities movement[37,38].

Health in All Policies (HiAP) is an approach that aims to generate cross-cutting public policies that systematically consider how to improve population health and health equity[39]. HiAP serves as a vehicle for the health sector to work with other government sectors to consider the potential health impacts of policies external to health systems as they are developed and implemented[40,41]. HiAP was widely embraced by municipal governments across Europe, Australia, and the US[42–45]. Yet, the adoption and translation of HiAP from theory to action has been found to be exceptionally complex for municipalities, with studies on the implementation process being relatively sparse[46–48]. Evidence suggests that because of HiAP's implementation complexity and vagueness of its translation, municipalities tend to adopt mainly the rhetoric of commitment to promoting health equity[49]. Thus, interventions implemented have been mainly small scale and do not inherently address the structural determinants affecting health equity[50–52]. Moreover, studies conducted in Scandinavian municipalities found that the traditional organizational change model centering on the adoption of a health unit or health promotion coordinator perpetuates organizational municipal silos and fails to create a sense of shared ownership or horizontal coordination[52–54]. Additionally, while municipal leadership recognize critical health challenges, their sense of accountability and political motivation to prioritize health varies, questioning the organizational readiness for change[50,55–57].

The Healthy Cities movement, formed over thirty years ago by the WHO, aims to promote health equity and sustainable development by placing health high on the city's political agenda[38,58]. It does so by implementing the multisector HiAP approach and designated areas of intervention such as equity and social determinants, healthy aging, active living, and healthy urban planning[59]. Unfortunately, many of the shortcomings of HiAP have also been referenced to the Healthy Cities movement. In 2012, a special commission of the Lancet brought forward the flaws of the Healthy Cities program and called for the adoption of complexity thinking to improve and deepen inter and intra municipal partnership to build and institutionalize equity focused urban health[60]. A recent comparison of policy across 25 cities that are members of the Healthy Cities network revealed that while a common rhetoric for promoting sustainable health equity policies existed, cities did not have measurable targets or detailed plans in place to translate intentions to action[61].

The apparent deficiencies in linking health equity to the work of municipal government and implementing it as part of the municipal DNA come as no surprise when analyzing the issue from a wicked problem perspective. As described earlier, a wicked problem has innumerable causes, is tough to describe, and doesn't have a right answer. As equity remains mainly a value laden concept among municipalities and is not clearly translated, formulation of the problem remains hazy. This leads municipalities to adopt mainly a health equity rhetoric without implementing actions to back it up. Additionally, the interwoven nature of wicked problems requires interlinked strategies and interventions. While HiAP offers an integrative model in theory, practice shows that implementing

and interweaving health equity into current organizational municipal structures is not a given. Current convergent thinking, for example, to establish municipal health units and/or hire health promotion coordinators to advance health equity leads in fact to a continuation of siloes. Finally, the wicked problem approach assumes the accountability of the policy maker, planner, or designer. However, can we even advance the municipal health equity agenda when leadership accountability is low and there is no sense of urgency to address health as part of the municipal agenda?

To overcome current deficiencies in health equity municipal models, this study proposes a new conceptual framework: MESH - **M**unicipal **E**ngine for **S**ocial **H**ealth. The study aims to develop a clear and measurable health equity implementation pathway which will generate municipalities' sense of urgency and accountability, create a defined organizational change matrix for inter and intra-sectoral health equity work, and institutionalize mechanisms for sustainability.

The conceptual framework of MESH – Municipal Engine for Social Health

To address the complexity and interconnectedness of wicked problems requires that organizations shift boundaries, abandon linearity, and embrace uncertanty[62,63]. This transformative organizational change process juxtaposes the institutionalized municipal setting in which existing cognitive activities and regulative elements are resilient to change[64]. Major obstacles include: the difficulty of changing the organizational culture and environment, carving out a new course when the organization seems to be functioning well, and planning and executing implementation[65]. Successful implementation i.e., translating health equity into actionable processes within the municipal setting requires a guiding framework that will push municipalities to observe the world differently, challenge presuppositions, expand boundaries, and build a new organizational DNA[66,67].

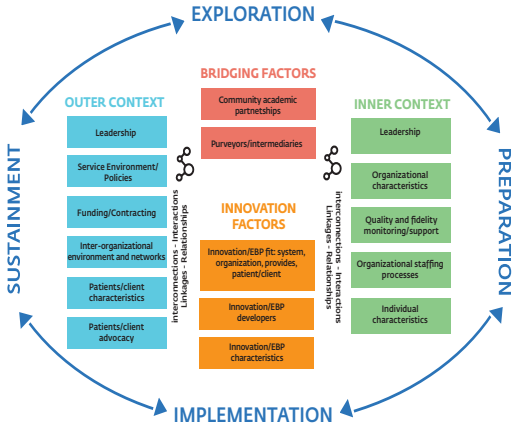
Different disciplinary fields have important but siloed theoretical knowledge on implementation, breaking habitual thinking, and constructing a pathway for change- all key constructs of a conceptual framework for implementing health equity in municipal government. The field of Implementation Science emerged over two decades ago to increase the uptake of scientific evidence and improve the quality and effectiveness of health services[68]. It focuses on understanding which intervention strategies are effective in achieving the desired outcomes in a specific context. Recently, there has been a deliberate focus of Implementation Science on health equity, understanding that persistent disparities are a form of implementation failure[69–71]. However, implementation science has yet to provide a comprehensive framework for translating equity across multilevel organizational units as well as multiple health challenges[18]. Moreover, literature detailing implementation science framework guidance on translating health equity in the municipal setting was not found.

Widely used in the private sector, Design Thinking Methodology has been used more and more over the past five years in health services research as well as in municipal settings. This unique disciplinary approach provides real world insights and understanding of the needs of patients/residents or providers by incorporating their feedback throughout the development process of new services. To break habitual thinking, interventions are implemented through an iterative process, with the outcome emerging only after cycling through several rounds of ideation, prototyping, and testing[72]. This differs from the traditional linear and often top-down approach of health interventions implementation[73]. Interventions aimed to reduce disparities and promote health equity utilizing Design Thinking Methodology have mainly focused to date on technologies such as designing and tailoring apps to improve use among disadvantaged populations[74]. While there is realization of the benefits that this disciplinary approach has to the field of health equity, a comprehensive framework translating equity from value to action has yet to be developed[75].

With 70% of organizations not achieving their aspired change goals[76], organizational change literature is vast, with many theories and frameworks assessing this enormous challenge. These theories focus on the interplay between four major constructs: context, process, outcomes, and time.[77]. The inner change process is multi-faceted, and theories aim to understand and explain how the change initiative is translated and diffused across multiple departments as well as throughout the different organizational levels from management to frontline staff[77]. Theories focus on the way in which people understand, modify, add or deflect organizational change throughout its diffusion across and within units of the organization, assessing the relationship between what exists and what is created[78]. In essence, this lends important insights to the translation process which is a process of social construction in which individuals attempt to interpret and explain a set of cues to create a plan of action for dealing with uncertainty or ambiguity[79,80]. Existing conceptual frameworks that aim to guide organizations on the implementation of health equity lack details on the inner organizational change process[18].

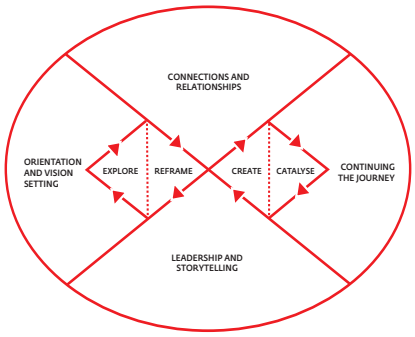
Drawing from the different disciplinary worlds of: (A) Implementation Science and the EPIS framework[81], (B) the Double Diamond design thinking framework[82] and (C) organizational sesnsemaking[80], the Municipal Engine for Social Health framework – MESH - offers municipalities an innovative pathway for implementing health equity focused change. Below, I briefly describe each of these core frameworks:

A. The Exploration, Preparation, Implementation and Sustainment (EPIS) Framework describes implementation as a process which moves through four phases: 1. *Exploration* - identifying practices to be implemented; 2. *Preparation* - redesigning the system to ensure consistent implementation of proposed changes; 3. *Implementation* - training, coaching, and active facilitation of evidence-based practices [EBPs] to be adopted; and 4. *Sustainment* - maintaining the use of the newly installed practices[83].



The framework identifies four constructs that interact and effect the implementation process. (1) Outer context describes the environment external to the organization and the inter-organizational relationships; (2) Inner context describes the characteristics within an organization; (3) Innovation factors are the details of the innovation that influence the implementation process; and (4) Bridging factors are reciprocal influences on the implementation process between inner and outer context[83–85].

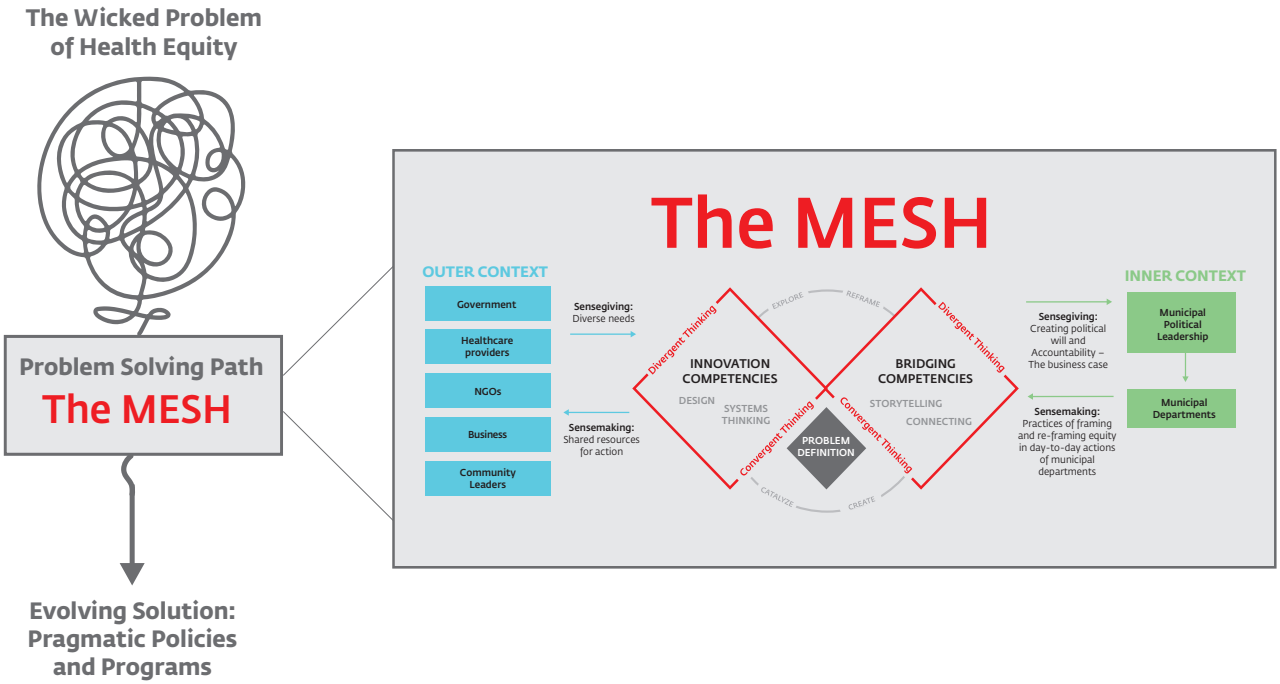
B. The Double Diamond Design Thinking Framework was created by the British Design Council which was set up in 1944 by Churchill to foster post war economic recovery through improving the design of British industry products[82]. The framework addresses complex problems by widely exploring an issue (divergent thinking) and then creating focused action (convergent thinking)[86]. It does this through four core competencies: (1) Systems Thinking understanding the interconnectedness between macro and micro as well as across silos; (2) Storytelling of why the issue is important to foster buy-in at all levels; (3) Designing through the power of innovative technical and creative tools; and (4) Connecting and convening diverse people, departments, and organizations. These four competencies propel change through four distinct phases of action: (a) exploring to understand the root causes of the challenge as well as the existing ideas and resources for solutions; (b) reframing to reflect new values and shift behaviors; (c) creating connections between different organizational layers and interventions; and (d) catalyzing change by prototyping and testing new interventions[87].



C. Organizational sensemaking is an interpretive process in which a map is charted to take ideas of change and make them local, workable, and understandable[88]. 'Making sense' of ambiguous change situations is done by members of the organization through giving meaning to the change and deciding what action is needed to address it in their work environment. This process is facilitated by sensegiving in which leaders influence others' sensemaking processes by communicating to them the construction of change. The aim of sensemaking and sensegiving is to build a new shared identity for the organization, transitioning from its current state to a new organizational DNA.[79,80,89]

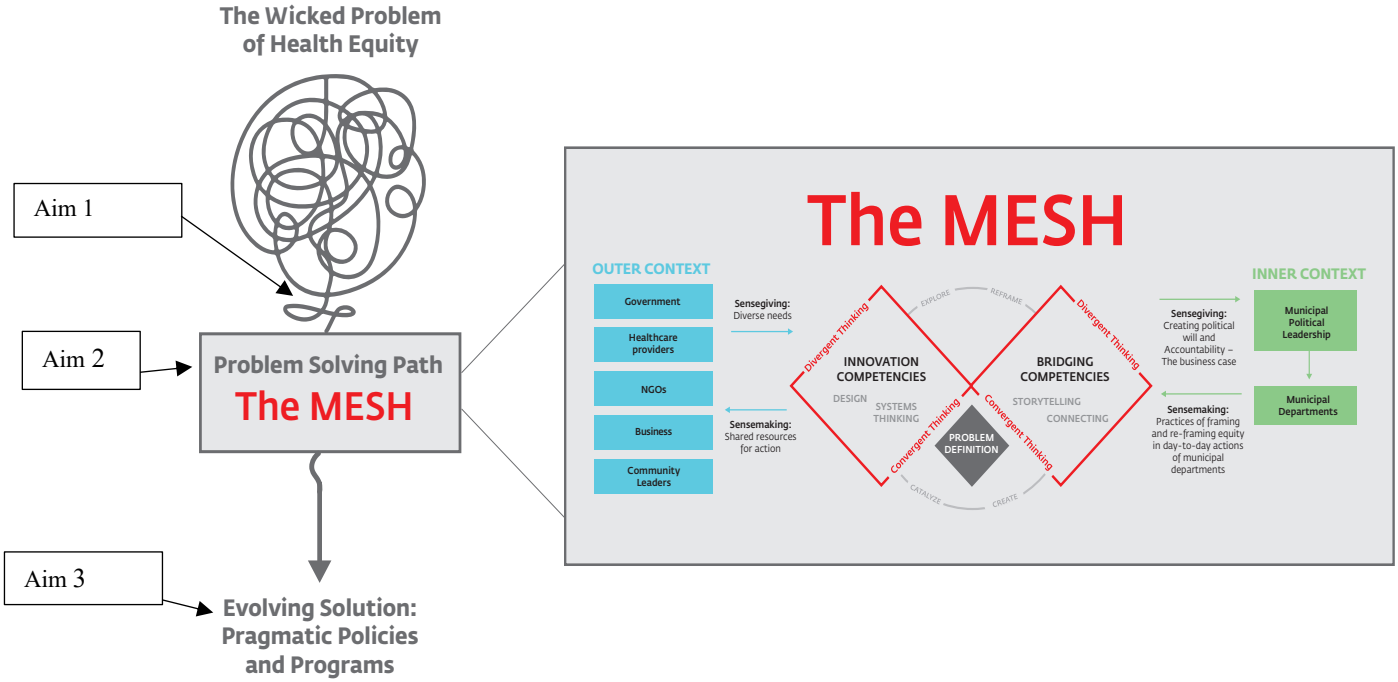
MESH proposes a novel conceptual framework to overcome current deficiencies in addressing the wicked problem of health equity by municipal government. It veers away from the traditional health promotion school of thought that has long been the basis for attempting to promote public health. Using an innovative and interrelated approach of organizational change, implementation science, and design thinking methodology, it offers a new pathway for translating health equity from theory to practice in the municipal setting.

Translating the value of health equity to actionable and pragmatic policies and programs requires an organizational translation, construction, and weaving mechanism – the Municipal Engine for Social Health - MESH. The MESH employs an agile and dynamic process.



At its heart, MESH connects horizontally between municipal government's relevant intersectoral actors and the intrasectoral municipal actors to vertically translate health equity through designing and implementing integrated health equity policies and interventions. To do so, MESH cultivates an agile process moving from divergent to convergent thinking through a unique system of sensegiving and sensemaking by employing four core competencies of storytelling, connecting, design and systems thinking that bridge between actors and foster innovation:

- Bridging competencies: Storytelling promotes sensegiving to create mutual buy-in by making the business case for integrating health equity into municipal day-to-day work by understanding for example the cost of illness for municipalities and the return on investment of applying a health equity lens[90,91]. Yet, without Connecting diverse stakeholders and ensuring that all relevant actors have a seat at the table, sensemaking of a new organizational equity focused culture will not take place. In many countries, health care is siloed from municipal systems. For example, decision processes by health providers, such as where to open clinics, are done autonomously not considering municipal residential structural needs.
- Innovation driving competencies: Systems thinking is key to sensemaking of the complexities of the tasks ahead and how to operationalize health equity for different municipal settings. Tools such as complexity analysis and concept mapping can promote a process for understanding not only what is required for implementing a specific intervention, but how an intervention can set off a train of interactions, good or bad, requiring additional actions[92,93]. For example, implementing an intervention to increase awareness to prediabetes screening among minority populations may create increased use of health services but also propagate residents' dissatisfaction with lack of physical activity infrastructure in low socio-economic neighborhoods requiring additional action. Designing innovative data driven tools can promote sensegiving either by driving residents' behaviors or creating a strategic alliance among different partners by making things tangible and visible to propel action. A common implemented tool to promote health equity in municipalities, for example, is a municipal health dashboard to visualize and drive population health improvements[94].



Study Aim and objectives

The aim of the proposed study is to test the feasibility and usability of the theoretical conceptual framework: MESH - Municipal Engine for Social Health and assess its impact on municipalities' integration of health equity as part of the municipal DNA.

The study, which will be implemented in five municipalities,

1. Address the following objectives (WP1):
   - 1.1. *Triggering a sense of urgency through a 'cost of illness' model for municipalities* to generate the business case as to why municipalities should integrate health equity into their day-to-day operations.
   - 1.2. *Develop new organizational roles for MESH* which will move away from traditional siloed positions such as health units.
   - 1.3. *Develop training for MESH personnel and a collaborative learning network* to instill core competencies of storytelling, connectedness, systems thinking and innovation implementation as well as equity translation skills through sensemaking and sensegiving.
2. Implement MESH in the field (WP2):
   - 2.1 *Implement MESH in five municipalities located at social geographic peripheries* that suffer from perpetuating health disparities and have not implemented health as part of the municipal agenda by adopting existing programs such as Healthy Cities. *Assess the implementation process of MESH* and identify facilitators and barriers to the municipal health equity change trajectory.
3. Provide Impact assessment (WP3):
   - 3.1. *Assess MESH's impact in integrating health equity into the day-to-day policies and actions of municipalities.*

Section b. Methodology

Setting:

The proposed study will be conducted using the platform of The Russell Berrie Galilee Diabetes SPHERE, a novel transdisciplinary initiative, the first of its kind in Israel, launched November 2021 by the Azrieli Faculty of Medicine, Bar-Ilan University. SPHERE (Social Precision-medicine Health Equity Research Endeavor) is a ten-year initiative that aims to reduce diabetes disparities in Israel's northern social-geographic periphery. It does so

by partnering together: academia, health care, and community to reduce existing and apparent silos, intervening at the municipal government level.
Five partnering municipalities: Nazareth, Nof Hagalil, Safed, Sakhnin and Shefaram have been selected and have signed agreements with SPHERE for intervention in its first phase of operation. These cities, with an overall population of 230,000 residents, represent the diverse cultural and ethnic groups in Israel such as Christian Arab, Muslim Arab, Druze, Jewish immigrants from the former Soviet Union, and Jewish ultra-orthodox populations. All five municipalities are ranked below five on the Israeli Central Bureau of Statistics municipal ranking (ranging from 1-10) and have apparent health disparities with higher morbidity and mortality from chronic disease including diabetes, cardiovascular disease, and cancer. Agreements signed with theses municipalities include support of a new organizational municipal position – the MESH coordinator. In addition, SPHERE has also created unique partnerships with relevant intersectoral actors to support and participate in SPHERE's city-wide program. These include: (1) government ministries (Ministry of Health, Ministry of Education, and Ministry of Social Equality); (2) The two largest of Israel's Health Maintenance Organizations that insure and provide services to over 85% of the population in the region (3) Six of the seven existing hospitals in the region.

Employing a mixed methods approach:

Using multiple methods, this research will examine each of the conceptual MESH framework's constructs and offer a novel and integrative way to understand the interplay between context, inner working mechanisms, and outcomes. The mixed methods approach 'focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or a series of studies'[95]. As such, it enables to address broad complex multi-faceted research questions more comprehensively than by using either quantitative or qualitative methods alone. Several strategies of mixed methodology will be employed: (a) *complimenting* qualitative survey data with semi-structured interviews to better understand what worked for whom in what situation and why so that facilitators and barriers of MESH's implementation process can be detected; (b) *Initiating* new insights and modifications needed by understanding discrepancies between quantitative results of implemented interventions and qualitative data regarding their design process such as assessment of implementation plans[96]. The study data include: (1) quantitative data generated through surveys, and (2) qualitative data collected through semi-structured interviews, structured observations, collection of working documents such as implementation plans and municipal policies.

Ethics:

Ethics approval will be obtained through Bar-Ilan University's institutional review board before the study.
We will obtain verbal informed consent from participants prior to participation in an interview (audio recorded) and written informed consent prior to filling out a survey. Participation in this study is voluntary and potential participants can discontinue their participation at any time (for participants consent form please see Annex 4).
Participants will be allocated an ID code, allowing all their data to be linked using this code. Municipal Departments will also be allocated a code to ensure anonymity and minimize the risk of identification. Potential identifying information in interview transcripts (e.g. references to job duties unique to an individual employee) will be removed. All data will be securely stored and password protected in Bar-Ilan University's SharePoint cloud. Any written information on employees will be stored in locked cabinets accessible only to the research team. The European Commission has determined on the basis of article 45 of Regulation (EU) 2016/679 that Israel offers an adequate level of data protection.

Work package 1 – Operationalizing MESH:

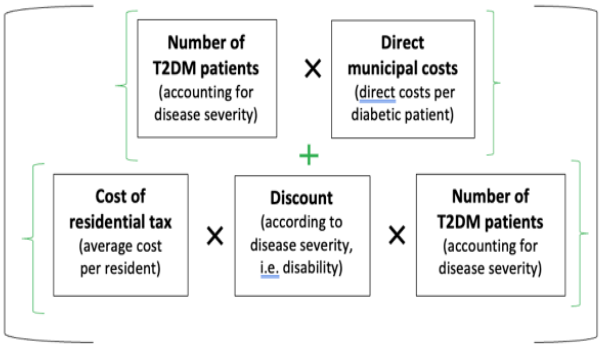
Objective 1.1: Triggering a sense of urgency through 'cost of illness' for municipalities.

Rationale: One of the major potential barriers in moving from rhetoric to action, is the lack of municipal government leadership's awareness to their direct responsibility for improving the health of their residents[50,55]. Implementing a health equity focused transformation requires a sensegiving process that creates true urgency among municipal political leadership that health equity is a critical issue, and that action is needed now[97]. We propose to develop the business case for municipal integration of health equity by creating a model reflecting costs and potential benefits for the municipal government: The municipal cost of illness model.
It has been widely established that persistent health disparities cause a major economic burden to health systems. Cost of Illness studies are commonly used to assess the economic burden of the disease on the patient and society[98.] These types of analyses often include the direct medical costs such as hospital visits or medications, as well as the

in-direct costs such as travel expenses to medical treatments or loss of work productivity[99]. Interestingly, a model of the direct and in-direct cost of illness for municipal government does not exist. Yet, the burden of disease has economic implications for municipal resources, especially for municipalities at the social geographic periphery who struggle financially. Preliminary findings (results not published) from an analysis I conducted on the potential economic burden of Type 2 Diabetes Meletus (T2DM) in the five selected municipalities showed, that 50% of patients with T2DM residing in these cities received municipal welfare support. This in turn has led to significant losses in residential tax collected, a major income for these municipalities' budget, creating an enormous yet preventable economic burden on the municipal budgets.
Working Hypothesis: Realizing the major, yet preventable, economic burden of health disparities on municipal budgets will create a sense of urgency among municipal leadership fostering readiness for organizational change.

Phase A: Assessing the current sense of urgency. Semi-structured interviews with political municipal leadership and heads of eight departments and their mid managers in each of the five municipalities will be conducted before implementation of MESH (n=150), to better understand their awareness of health disparities, and the perceived role and responsibility they believe municipalities have in addressing health disparities and improving residents' health. An interview guide will be developed and piloted to test the questions allowing revisions and feedback to fine tune the content and process[100]. Interviews will be recorded, transcribed and analyzed in Atals.ti software. A code book will be developed in accordance with the MESH conceptual framework and content analysis will be conducted to derive themes relating to municipalities sense of urgency and if and to what extent they are ready to implement health equity focused transformative organizational change. Interviews will be coded by two independent researchers to attain inter rater reliability, discrepancies in coding will be discussed in the wider team to refine and attain agreement.
To complement the qualitative data, we will administer a survey on organizational readiness using the Organizational Readiness for Implementing Change (ORIC), a 12-item validated and widely used instrument that measures organization members change commitment and change efficacy. Change commitment (5 statements), reflects organizational members' shared resolve to implement a change such as "People who work here are committed to implementing this change". Change efficacy (7 items), reflects organizational members' shared belief in their collective capacity to implement a change, such as "People who work here feel confident that they can coordinate tasks so that implementation goes smoothly". Each of these 12 items is scored using a 5-point Likert scale ranging from "Disagree" to "Agree"[101]. Mean scores of the 12-item ORIC scale will be calculated. The non-parametric Kruskal-Wallis test will be employed to examine differences across the five municipal settings.
Following the separate analyses for each municipality, the quantitative and qualitative data will be triangulated at the interpretation stage to provide a comprehensive description of transferability and key factors similar across the five municipal sites. First, the quantitative and qualitative findings will be triangulated separately for each setting by identifying and comparing the main findings. Subsequently, patterns of similarity or difference will be examined across the five settings. Two researchers will analyze the data independently to minimize potential bias. Discrepancies between researchers will be reconciled through discussion until a consensus will be reached.

Phase B: Creating a sense of urgency utilizing municipal cost of illness model.
I am developing a new model of "Municipal cost of illness". Using the case study of T2DM, this model calculates the direct cost of patients to municipalities. It includes data on the number of T2DM patients in each of the five municipalities, accounting for their disease severity, as well as data on exemptions given to these patients in residential tax payments collected by the municipality. This data will be retrieved from municipal and partnering health maintenance organizations. Analysis will be conducted calculating the direct loss (i.e. number of residents receiving residential tax discounts) and avoidable loss (potential residential tax income from these patients had they not received a discount). It is important to note that residential tax is the major



source of municipal revenue and therefore a loss in this potential income has major implications for poor municipalities.
Following the economic municipal cost of illness analysis, municipal political leadership and department heads will be convened in each of the five municipalities for a focus group (10-12 participants each) in which the results on the cost of illness will be presented. Discussions will be recorded and transcribed. Using content discourse analysis different actors' perceptions will be coded and themes will be derived to assess and identify if a change in sense of urgency occurred. Furthermore, we will assess to what extent has a sense of urgency triggered motivation among municipal leadership to address the wicked problem of health equity. Additionally, transcripts will be analyzed to identify if municipal leadership suggested a charted course of action. We will also administer once again the survey using the ORIC instrument to assess if there is a measurable difference in municipalities political and professional leaderships' readiness for implementing change.

Objective 1.2: Develop new organizational roles for MESH

Rationale: Previous studies indicate that traditional organizational positioning of health units perpetuates silos[53]. Additionally, while municipal hiring of health promotion coordinators has been perceived as an indicator for the integration of health into the municipal DNA, defacto it has failed to do so[54]. Organizational change and implementation of innovation has as much impact on structure as it does on culture. Municipal organizational structures operate in a hierarchy-based system of specialization and formalization. Interestingly, while municipal tasks have changed and expanded because of new responsibilities transferred from central to local government, municipalities' organizational structure remains unchanged[102].
Structural innovation theory deems that organizational outputs are a result of the composition of a nested organizational hierarchy of core and peripheral sub-systems and their linking mechanisms. Core subsystems are not only more tightly connected with other subsystems but are also associated with strategic performance parameters[103]. Hence, a transformative organizational change approach to integrating health equity into the municipal systems requires organizational positioning so that MESH becomes a core sub-system driving innovation.
Working Hypothesis: Mapping the organizational network will enable to measure MESH's organizational positioning and continuously adjust it so that it becomes a core municipal sub-system driving health equity innovations.
Workplan strategy: In partnership and upon the recommendation of the municipal leadership, MESH will be positioned within the existing organizational structure and hierarchy. This may create diverse organizational positioning across the five municipalities, with some municipalities choosing, for example, to position MESH directly reporting to the municipal general manager, while others may choose to position MESH within other municipal departments such as social welfare. Social Network Analysis will be used to determine the extent to which MESH becomes a core municipal sub-system**.**
Social Network analysis gives unique insights to organizational positioning as it views the implementation process of a new program or organizational policy as a dependent of the pattern of social ties between the differential network actors and their position in the organizational network[104]. The network position of the actor does not only determine access to resources, such as information, but can also affect group cohesion, coordination, knowledge, problem solving, and innovation[105,106]. Survey data on the information flow, advice network and support between MESH and other municipal actors to determine the strength of organizational ties[107] will be collected from municipal political leadership and department personnel at different hierarchical levels (department heads, meso level management and front-line staff) (n=150) at five time points: Post 6 months, 12 months, 24 months, 36, and 48 months from MESH's initial positioning. The survey will ask actors to map which other actors do they work on issues of health equity and how often, ranking the connection between 1 (not often) to 5 (very often). This will enable us to create a matrix of who is connected to whom and the intensity of their connection from 1 to 5. Semi-structured interviews will also be conducted to identify the discourse between the various network actors during MESH's implementation[108]. This will enable to better understand not only the intensity of the connection between actors, but the information discussed. The interviews will be recorded and transcribed and analyzed in Atlas.ti. Interviews will be coded to assess and obtain a deeper understanding of what the connection between actors includes and means in practice in their daily work.
Joint involvement data analysis will be conducted using UCINET software. Network measures in the proposed study will relate to the relational influence of actors' vis a vis centrality measures. Centrality measures assess the

distribution of social ties among actors reflecting the asymmetry and differential power actors have in the organizational network. The study will assess: (a) Degree Centrality, a simple quantitative measure of an actor's social activity calculating the number of connections or ties an actor has to other actors; (b) Closeness centrality which measures the geodesic distances between actors, identifying actors who serve as a "reference point"; and (c) Betweenness centrality which identifies actors who are gatekeepers in the flow of information, and have a strategic role because of their position in bridging structural holes. Network Density a structural assessment of the transitivity of ties, will also be assessed by calculating the ratio between direct ties and the total number of possible direct ties in a network. A network with high density reflects not only high connectivity of actors but cohesiveness[109]. Actor attributes such as gender, profession, municipal role, and seniority i.e. the number of years employed at the municipality, will also be collected to assess, as part of the joint involvement data analysis, the relationship between attributes and type and intensity of the ties formed.

Objective 1.3: Training on MESH competencies:

Rationale: Comprehensive equity efforts require to tailor interventions to address the needs of different population groups, while also changing internal policies, processes, and practices throughout multiple levels within the organization[64]. As previously discussed, while the overarching equity rhetoric exists, the process of intra-organizational translation, adaptation, and implementation across different departments and staff levels remain a black box to decipher[110]. Existing frameworks lack important guidance to organizations for the practical implementation of equity-wide change efforts, tending to focus on broad 30,000 feet statements[18].

Working Hypothesis: Training and mentoring of MESH personnel on the use of essential core competencies will assist not only the translation of health equity from theory to practice but its implementation in day-to-day municipal work.

Workplan strategy: A novel training program followed by a 10-month period of hands-on mentoring for MESH personnel will be developed and implemented. Initial training will include sessions using frontal lectures, case-based learning, and workshops on the four core competencies required of MESH personnel: Storytelling, Connecting, Systems Thinking and Using innovative design tools to foster sensegiving and sensemaking skills:

A. Storytelling - Research suggests that stories are key to understanding as they enable to communicate meaning, thus enhancing sensegiving skills that are crucial for shaping and presenting future directions of an organization. MESH personnel in each of the five municipalities will be trained on (1) creating a storytelling blueprint that includes identifying key stakeholders and their diverse needs; and (2) building storytelling prototypes using not only various mediums but also creating different versions to increase buy-in from relevant stakeholders.
B. Connecting – Health equity requires that we look at the problem from many different perspectives connecting multiple stakeholders. This workshop will focus not only on how to identify relevant stakeholders within the municipality but also in relevant organizations. MESH personnel will be trained on how to empower creative collaboration using two main modes of thinking—divergent and convergent—that are used in tandem to create and make choices. Divergence allows teams to come up with as many ideas as possible, while convergence homes in on what's most important.
C. Systems Thinking – Organizations are systems driven by human action, i.e. human systems made up of people with diverse needs, challenges and motivations. MESH personnel will be trained on (1) How to visualize a system to make sense of complex situations, gain techniques for mapping complex systems, and identifying the root causes of a problem; (2) Finding the right problems to solve and picking the best solutions to experiment with.
D. Using innovative design tools – MESH personnel will be trained on how to use newly implemented visual tools to drive change, such as the SPHERE municipal dashboard. The dashboard enables visualization and analysis of relevant municipal and health data. The workshop will include training how to formulate questions, which data to collect, and how to routinely assess data to drive change.

Training will be followed by a 'hands on' mentoring for MESH teams in each of the five municipalities. Mentors from the PIs lab, with experience in implementation science, organizational change, and design thinking methodology, will assist teams in the MESH's implementation process, through a yearly cycle of exploring, reframing, creating, and catalyzing. MESH teams will also convene once a month to share progress and barriers, forming a learning network.

A mixed methods assessment of the extent MESH personnel internalized and are applying the core competencies required, will be developed and conducted. Data will include observations, surveys and content analysis of documents: (1) Mentors' structured observations - Structured observations enable the researcher to view an event or series of events in its natural setting and recorded. The observations are structured in the sense that pre-determined categories are used to guide the recording process. The observations will be analyzed according to the pre-determined activities by two independent reviewers to ensure lack of bias and interrater reliability; (2) Surveys and semi-structured interviews to understand MESH personnel's perceived effectiveness, i.e. their knowledge, skills, and ability to conduct the required MESH tasks[111]. This will include development of an appropriate interview guide, semi-structured interviews conducted with relevant municipal personnel, recording and transcription of the interviews and their analysis in Atals.ti, and conducting content analysis of the data according to the pre-determined codes; and (3) MESH organizational implementation plans that document the strategies devised, actors involved, organizational resources utilized, and progress achieved over time. Implementation plans provide step-by-step instructions and are used to transform abstract concepts within strategy plans into real-world action. They cover all aspects of a project including budget, timeline, and personnel. Implementation plans of the MESH from each of the five municipalities will undergo content analysis according to a code book developed.

Work package 2 – Implementation of MESH in the field:

Objective 2.1: Identifying the facilitators and barriers in the implementation process of MESH

Rationale: Limited literature exists on the implementation of health equity as part of the municipal DNA. Therefore, the facilitators and/or barriers affecting the implementation process remain unclear[47,48]. Perpetuating health disparities signal, that interventions are not achieving their aims. The stagnation, and at times the exacerbation of health disparities, is in fact a form of implementation failure. Implementation science has long called for the identification of efforts to achieve the intended change, as implementation strategies are often mismatched to organizational barriers[112]. The lack of such identification limits the ability to inform implementation practice and provide guidance not only on what strategies should be used in what contexts but what strategies should not[113].

Working Hypothesis: Identifying facilitators and barriers in MESH's implementation process will enable to identify effective and non-effective strategies to drive the transformative change process.

Workplan strategy: MESH will be implemented in the five selected municipalities. Utilizing the theoretical framework of Implementation Theory, we will unpack and identify the barriers and facilitators of the differential MESH framework components during its ongoing implementation[114]. Implementation Theory is an inter-disciplinary perspective, stemming and building on frameworks such as Diffusion of Innovations[115], assessing comprehensively sociological and psychological factors that affect organizational processes of innovation and intervention. The theory includes a set of four constructs linking between the organization's context and organization members' actions: (a) Potential aims to understand the shared motivation of the organization's members to participate in implementation activities as a derivative of their attitudes and intentions, shared values and commitment to the transformative process; (b) Capacity to drive change in the existing organizational structure and culture; (c) Capability or the operationalization of intervention and the strategies employed to make it workable and embed it into everyday practices, and (d) Contribution or the actions to implement the complex intervention.

A mixed methods design, composed of qualitative and quantitative methods will be employed. First, an interview guide will be developed to assess MESH's implementation and municipal personnel's actions through the four constructs of potential, capacity, capability, and contribution. Interview questions will inquire as to MESH's potential and why members' perceive MESH is needed within municipal government. Question will also address interviewees perceived capacity and the extent to which they think MESH can be successfully implemented in the existing municipal culture. Finally, questions will address the capability and contribution of MESH to integrating health equity into municipalities, the strategies chosen to implement MESH , and the facilitators and barriers municipal personnel encountered in their implementation.

Interviews will be conducted in the five municipalities with MESH personnel, municipal intra-organizational stakeholders, and inter-organizational partners such as health care providers and community organizations (n=100) at the end of each implementation cycle (see Gantt chart on page 14). Interviews will be recorded, transcribed and analyzed in Atals.ti software. Using explanatory content analysis interviews will be coded for potential and capacity. Additionally, content analysis will be conducted by two researchers to map the implementation strategies

used according to the compilation of intervention strategies as per the Expert Recommendations for Implementing Change (ERIC)[116]. ERIC is a compilation of 73 implementation strategies divided into nine clusters of implementation strategies, including engaging consumers, change to infrastructure, financial strategies and train and educate stakeholders. Implementation strategies identified will then be scored according to their 'Go Zone'. Go-zone plots provide a bivariate display of feasibility versus importance so that it is clear which strategies are the most effective: Go-zone I: Importance and feasibility are both high. Go-zone II: Importance rating is lower and feasibility rating is higher. Go-zone III: Importance and feasibility ratings are both low. Go-zone quadrant IV: Importance rating higher and feasibility rates lower. Coders will identify implementation strategies, categorize them according to ERIC pre-defined clusters and allocate the relevant 'Go Zone' score. In case of a discrepancy among coders discussions will be conducted until a consensus is reached. The analysis of implementation strategies and their Go-zone across the five municipal sites will also be assessed to the extent that they facilitated the organizational implementation of MESH as well as the barriers encountered. This will allow us to identify not only implementation strategies, but the facilitators and barriers encountered as well as cross site variation and adaptations required at each municipal site. These findings will serve MESH's dynamic loopback model (see page 13) informing future implementation practice and refine, if needed, implementation strategies.

Work package 3 – Impact Assessment of MESH:

Objective 3.1: Assessing MESH impact on integrating health equity into the day-to-day policies and actions of municipalities.

Rationale: Literature conveys the problematic integration of health equity into municipal policies and detailed plans [61]. This in essence poses a major question as to the impact that existing programs, such as HiAP or Healthy Cities have had on health equity and the extent that these programs were able to drive transformative organizational change.

Working Hypothesis: Successful implementation of MESH will lead first to integration of health equity into intra-municipal day-to-day work followed by a wider impact on residents' health.

Workplan strategy: In mathematics, solving an expression requires that we apply the order of operations, a set of rules to be followed in particular sequence: evaluate the parentheses first before continuing on exponents, division or multiplication and finally addition or subtraction. Assessing transformative organizational change requires the same. First, we need to assess the impact of MESH within the 'organizational parentheses' to understand the extent to which health equity was integrated into the policies and municipal workplans. Second, we need to assess the exponents of the MESH sift by assessing the multiple integrated health equity interventions that were implemented to address the structural determinants driving health disparities. Finally, we can assess whether an overall impact on residents' health occurred over time. We will employ the following impact assessments:

A. Over the five-year study period, at the beginning of each implementation cycle we will analyze the five municipalities' annual policies and programs as they relate to health equity across major municipal domains including education, urban planning, and welfare. At the end of each implementation cycle, the research team will collect municipal documents describing new policies developed and voted on in city council meetings as well as notes from relevant departmental meetings pertaining to development of new programs. New policies and programs will be assessed for presence of health equity. First they will be analyzed for exclusion/inclusion of health equity using a yes/no binary measure where 1 will be given to a policy or program that relates to health equity versus a score of 0 given to a policy or program that does not relate at all to health equity. This will enable us to quantify the overall number of policies and programs creating a health equity municipal score. In addition to the number of new policies and programs addressing issues of health equity, we will also assess the quality of these policies and programs using a three point ranking system: a score of 3 will be given if the policy or program state a specific standard or aim with a measurable target, i.e. threshold and timeframe; A score of 2 will be given if the policy and program describe a specific standard or aim but do not include a measurable target such as a timeframe or size of a program; A score of 1 will be given if the policy and program are deemed aspirational but do not pertain to a specific target, i.e. if there is a general statement of what to achieve, but it is unclear what actions will be taken, or the exact aim is no clear; and a score of 0 will be given if we cannot determine any specificity[61]. Cities' policies and programs will be coded by multiple coders to achieve inter-rater reliability.

B. We will annually assess health equity interventions implemented and their interrelatedness to understand to what extent they engaged with the target audience and/or effective in attaining the health goal defined. Analyzing MESH implementation plans (see WP2), interventions will be coded according to the RE-AIM

framework, one of the most widely used frameworks in implementation science. RE-AIM consists of five domains: (1) Reach – to what extent did the target population participate in the intervention. This will be measured by analyzing the number of actual versus anticipated participants in an intervention; (2) Efficacy - the impact of the intervention on the specified outcome criteria, assessing to what extent the outcomes of the intervention were achieved. For example, an intervention to raise parents awareness to elementary school children's obesity through healthy lunches would assess the number of children who bring a healthy lunch to school; (3) Adoption - the resources allocated by the municipality and relevant interorganizational stakeholders for intervention addressing health equity; (4) Implementation - the quality and consistency of the delivery of the different interventions by the municipality; and (5) Maintenance - the extent that the intervention becomes routine in municipal practice[117].

C. Municipal Health Ranking – Within the SPHERE platform, an Israeli Municipal Health Ranking is being developed, based on the Robert Wood Johnson Foundation's County Health Rankings model[118]. This ranking includes 160 indicators of clinical data such as number of T2DM patient, as well as the accompanying social information such income or education level; Municipal health ranking for the five municipalities will be calculated annually, beginning with a calculated score pre-MESH's implementation. Differences will be assessed over time for significance.

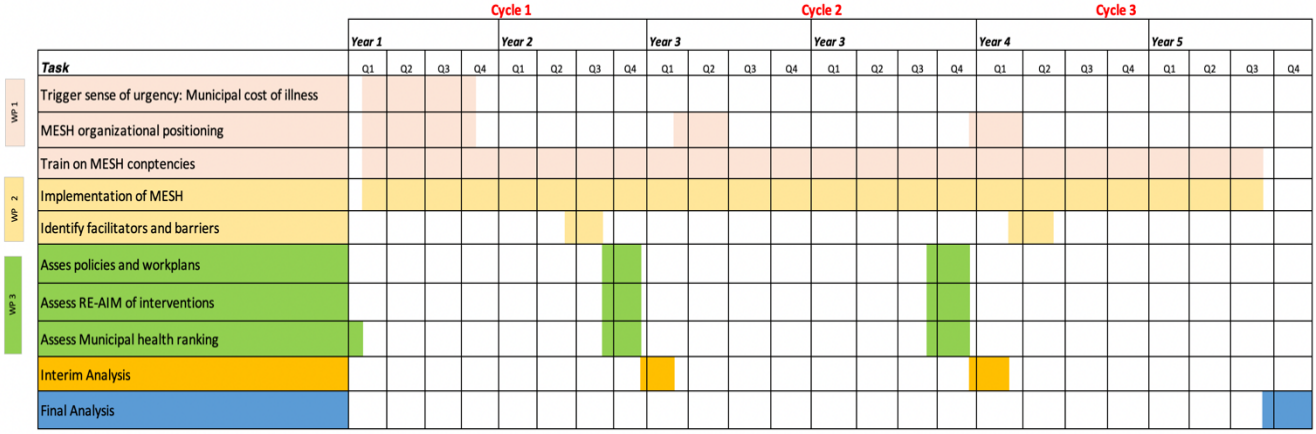
The MESH loopback work packages agile model – risk analysis and impact.

The major risk in research conducted in real-world settings is that intervention efforts will often proceed differently than planned, despite existing scientific knowledge. This common discrepancy can lead not only to a gap between expected and actual findings but even to implementation failure. To mitigate this risk the study will employ a loopback model. Using an agile loopback model will enable to capture in real time not only the complexity of the system but possible deterioration of the interventions.

The three work packages will be employed in three cycles over the 5-year period with interim analyses to inform and improve MESH as presented in the Gantt chart below. Preceding the cycles, we will begin with the two first objectives of workpacakge 1: (obj 1.1) triggering a sense of urgency, and (obj 1.2) MESH organizational positioning as they are the basis required for implementing the MESH in participating municipalities. The first cycle, which includes the initial setup of the MESH will run for 22 months. The second cycle will run from month 26 to 34 months, and the third cycle from 39 months to 55 months.

Interim analysis of data collected will be conducted as described in the three work packages looking at specific as well across the five municipalities. This will allow the research team to modify crucial barriers impacting the implementation process. For example, training MESH personnel as well as their mentoring by the study's team (obj 1.3) will run throughout the entire study. As MESH personnel will work across multiple municipal departments, they will require comprehensive knowledge from urban planning to education and welfare. Interim analysis will allow us to understand the extent to which MESH personnel are internalizing and utilizing the required competencies of storytelling, connecting, systems thinking and using relevant design tools to drive the municipal health equity change trajectory and if additional support and training is required. Another example of the benefits of employing an agile loopback model is the ability to analyze facilitators and barriers in the positioning of new municipal organizational roles. Municipal organizational structures operate in a hierarchy-based system of core and peripheral sub-systems. Core subsystems are not only more tightly connected with other subsystems but are also associated with strategic performance parameters[103]. Hence, a transformative organizational change approach to integrating health equity into the municipal systems requires organizational positioning so that MESH becomes a core sub-system driving innovation. Assessing MESH personnel's organizational positioning (obj 1.2) throughout the project will enable us to make sure they become municipal core subsystem. Past studies on municipal health units have shown us that what the municipality views as the right positioning can create a peripheral unit that is unable to move organizational change. Finally, interim analysis will also enable us to assess the extent to which the MESH is facilitating the formation and implementation of new policies and programs with both intra and intersectoral partners (obj 2.1, obj 3.1). Given the perpetuating silos and limited resources of municipal governments, especially those located at the social geographic periphery, implementation of new policies and programs pose a major challenge. Analysis will not only enable us to assess the formation of new policies and programs but also their quality and the extent that MESH is facilitating policies and programs that have measurable targets rather than remain at the rhetoric level without purposeful action. If

implementation failure is detected, the study team will re-analyze the implementation chain to identify possible barriers and assess additional modifications required to the MESH.
Interim analysis results will be discussed not only among the research team but presented to municipal partners to create open communication, reduce frustrations, build trust, and enable support for modifications as required.



Why is this study important?

- Health and health care disparities between populations continue to perpetuate worldwide and require addressing the wider social determinants affecting health.
- The framing of health equity as a wicked problem brings front and center the challenge in translating equity from theory to action.
- A central actor in addressing health equity is the municipal government. Yet, health equity is often perceived as external to the day-to-day tasks of municipalities.
- We offer a novel conceptual framework for translating health equity from theory to action harnessing theories from the disciplines of implementation science, design, and organizational sociology.
- The study operationalizes, tests, and assesses the application of the MESH model in five municipalities to understand real world implications, and to deepen the scientific knowledge of equity in the health domain

Why us?

I have been studying health equity and organizational change for the past 11 years. Specifically, I discovered that the organizational translation process of health equity is often taken for granted without clear guidance and thorough investigation of the nature of the translation process and its implications to reducing health inequities. My postdoctoral training with Dr. Marshall Chin, a world-leading researcher in the field of health equity, deepened my understanding and knowledge and created the basis for establishing my independent research group HEAL – Health Equity Advancement Lab. In 2020, I developed the novel SPHERE (**S**ocial **P**recision-medicine **H**ealth **E**quity **R**esearch **E**ndeavour) initiative - a transdisciplinary consortium of partners from medicine, health services research, education, design, economics, and organizational change to design and implement unique interventions for reducing the onset and burden of diabetes in social-geographic peripheral communities suffering from exacerbated health inequities. I am leading SPHERE's planning, consortium building, and the development of its research infrastructure. Based on the above, I believe we are uniquely equipped with the expertise, tools, experience, and ability to perform this proposed study.

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