WELL V2:

EVIDENCE BEHIND THE **COMMUNITY** CONCEPT

FEATURE C01: HEALTH AND WELLNESS PROMOTION

OVERVIEW

Part 1: Provide information and communications about the WELL features pursued by the project as well as general information on the impact of the built environment on health.

SCIENTIFIC BACKGROUND

- Health literacy refers to a person's cognitive and social ability to access, correctly interpret and truly understand basic health information – as well as the resources needed to act on these understandings and make decisions that promote and maintain individual and community health.[1-4]
- A person's level of health literacy is affected by their personal background and environment, including culture, language, general education and the individuals and institutions in their social and professional networks.[5]
- Self-efficacy refers to an individual's belief in their ability to control aspects and events in their life, and is tied to the ability to cultivate feelings of empowerment.[6]

KEY HEALTH AND WELL-BEING EFFECTS

- Low health literacy is directly correlated with lower general, mental and physical health -- an association that has been particularly well documented in studies of older adult populations.[7-13] Low health literacy is also associated with higher rates of all-cause mortality (i.e., deaths from any cause in a given population or subset of a population across a certain length of time), particularly in older populations who have not participated in formal or informal lifelong learning.[14-16]
  - Several studies note the impact of health literacy on health status varies depending on immigrant status, race/ethnicity and language proficiency.[17-21]
- Improved health literacy is associated with an increase in preventative health measures, such as getting a general health check-up, mammograms, flu vaccinations and dental cleanings.[22-27]
  - Providing health trainings can empower employees to organize and lead programming related to their own health goals, and encourage a higher level of engagement with existing programming.[28]

HEALTH PROMOTION BENEFITS AND STRATEGIES

- Incorporating functional health literacy skills (e.g., reading and interpreting nutrition labels) into educational centers for both children and adults has been identified as an effective route for improving health literacy and reducing health inequity.[29-34]
- The workplace can be a vehicle for health promotion of all kinds, but participation in programming can be low.[35-38] To be the most effective, research shows that programming and communication should be multi-modal (e.g., a mix of behavioral and organizational interventions).[39]
- Two types of workplace interventions are most impactful in enhancing employee health:
  - Preventative measures that can reduce accidents or occupational/industrial risks.
  - Education and access to health-promoting behaviors that can reduce noncommunicable diseases.[16]
- Organizations looking to cultivate a health-promoting workplace environment should identify and prioritize the specific needs and current competencies of the people using the space, as well as the culture and norms of the organization.[40] Health promotion and communication efforts tailored to specific audiences and their needs are the most effective.[41]
  - Improvements to individual and community health can be achieved by making information more accessible, and building individual knowledge on healthy behaviors.[42-45] Workplaces can further support employees by encouraging them to utilize health-promoting amenities and consistently communicating opportunities that facilitate acting on that knowledge to engage in healthy behaviors.[46]
- Other strategies for success include engaging all levels of the organization, accommodating various learning styles and creating messaging that is simple and aligned with other programming.[16]

ADDITIONAL NOTES

- Around the world, the prevalence and consequence of low health literacy and poor health promotion most severely affect vulnerable populations, including older adults, minority groups, individuals with low levels of education, immigrants and people with chronic diseases.[16,31,47]

FEATURE C02: INTEGRATIVE DESIGN

OVERVIEW
Part 1: Facilitate an inclusive and collaborative planning process to engage stakeholders from project planning to WELL Certification.
Part 2: Establish and promote a health-oriented project mission.

SCIENTIFIC BACKGROUND
- The socio-ecological approach to public health, sometimes called eco-epidemiology, recognizes that only a fraction of an individual's health status comes from genetic factors.[48] An individual's health status is significantly influenced by their physical and social environment – even more so than genetics or medical care – including community-level factors such as neighborhood amenities, social support and opportunities to be physically active and make healthy food choices.[49,50]
- This is in contrast to the bio-medical approach to public health, which focuses on individual behavior change and is context- and place-neutral, and which has dominated public health during the last 50 years.[51,52]
- The socio-ecological approach recognizes that environmental modifications and programmatic changes have longer-lasting impacts than exhortations for individual change, particularly for vulnerable populations.[53,54] Stakeholder engagement is key to establishing environmental modifications, programmatic changes and other strategies that meet stakeholder needs and help improve stakeholder health.[55]

KEY HEALTH AND WELL-BEING EFFECTS
- Projects that consult key stakeholders during planning and development processes can better serve stakeholder needs and positively impact the health and well-being of certain populations, particularly disadvantaged communities.[56-58]
- Studies show that low-income and minority populations are most often excluded from planning discussions and decision-making, leading to design decisions that do not address their needs and even increase their exposure to a disproportionate burden of poor health conditions, displacement, pollution, crime and lack of access to opportunities and services.[57,58]
  - Populations such as children, minority groups, Native Americans and rural and urban poor experience increased risk from environmental exposures and related health conditions.[58]
  - Furthermore, current methods of data capture are believed to underestimate exposure levels, suggesting exposure is greater than reported.[58]
- Engaging stakeholders in decision making also fosters social cohesion, which builds social bonds among members of a community.[59]
  - Often referred to as "social capital," social cohesion serves as a proxy for the belief that an individual can impact collective action and contribute to the common good of their social network.[60]
  - Studies have found that individuals within neighborhoods that reported higher scores of social cohesion experienced positive effects on physical and mental health.[61]

HEALTH PROMOTION BENEFITS AND STRATEGIES
- Engaging diverse stakeholders from the project onset creates the opportunity for collaborative dialogue between key decision-makers, planners and individuals who will be impacted by the project.
- This integrative stakeholder engagement can enhance the legitimacy and accountability of policies and practices, increase policy effectiveness, increase transparency in decision-making, improve trust and reduce conflict.[55,62-66]
- Practicing goal-setting and incorporating integrative design with key community stakeholders from the start of a project can enhance the creation of equitable policies by engaging with disadvantaged groups and empowering them.[67,68]
- Participation in collaborative, stakeholder planning can also create social learning by valuing other stakeholders' perspectives, as well as social and human capital.[69,70]
- Stakeholder input can help a project identify and address its essential goals for health promotion and incorporate design that best celebrates the project's unique identity, culture and place, creating a space that meets the needs of all stakeholders and enriches the well-being of both occupants and visitors.[57,71,72]

- A case study in France that brought diverse stakeholders together in integrative planning for a project reported that the community engagement and feedback provided valuable input that would be incorporated in the master plan. The process was also used to engage community stakeholders, cultivate a shared practice of community engagement and create an educational tool for participants on urban planning and design.[73]
- Establishing a health-centered mission from the beginning that reflects occupants needs and voices, and transparently communicates how the project will adhere to that mission through design and operations, can help occupants remain engaged in the space and empower them to utilize all available health and wellness programs and policies.[69,74]

ADDITIONAL NOTES
- As marginalized communities tend to be less represented in stakeholder consultations, it is important to be clear on the cost for each group to participate in terms of time and labor.[55]
- Taking the time to develop better community relationships can help support more effective engagement, particularly for groups that may have historical distrust of certain organizations and of government.[75]
- Holding stakeholder meetings after normal work hours, offering free childcare, locating the meeting close to transit and reimbursing travel costs are strategies that may help encourage better participation from underrepresented groups.[76]

FEATURE C03: EMERGENCY PREPAREDNESS

OVERVIEW

Part 1: Undertake a risk assessment, develop an emergency management and response plan outlining specific steps to take in various types of emergencies and conduct occupant emergency drills.

SCIENTIFIC BACKGROUND

- A disaster is any event that exposes a significant number of people to a hazard or threat, resulting in injuries and/or death.[77] Disasters disrupt normal processes and overwhelm the affected community's capacity to respond.[78,79]
- An emergency refers to an event that can be handled with existing resources and capacities, but requires individuals and communities to take extraordinary measures to prevent further harm or damage to people or the environment.[77-79]
- Both natural- and human-caused emergencies and disasters can occur anywhere in the world, affect any person and impact the health and well-being of both persons directly affected and also the community at large.[77,80]
- Planning helps communities adequately respond to active emergencies and prevents future emergency or disaster events from escalating into extreme situations by identifying ways to potentially mitigate and control the reach and magnitude of experienced losses.[77]

KEY HEALTH AND WELL-BEING EFFECTS

- Types of emergencies and disasters range from natural disasters, toxic exposures and acts of violence, to communicable and non-communicable disease events.
- The frequency of natural disasters has increased in modern times. In 1960 there were 40 natural disasters globally - the highest recorded number since the beginning of the 20th century.[81] In the 21st century, the lowest recorded year saw 276 natural disaster events, while the highest year saw 432.[81] In 2018 alone, 281 natural disasters caused nearly 11,000 deaths and further affected 61.7 million people worldwide.[82] Global death rates due to natural disasters have decreased during this time due to prediction technology, resilient infrastructure and emergency preparedness and response, but this increase in annual disasters highlights the need for institutions and communities to be prepared to quickly and efficiently respond to natural disasters when they occur.[81]
- The International Association of Fire and Rescue Services reports that there were 777,794 structure fires in 2016, over half of which (475,500) were in the United States, followed by Russia (107,205) and France (86,407).[83]
  - The above reflects data from 20 countries around the world, suggesting that if more countries collected this data and/or participated in reporting, the total number of annual structure fires would be much higher.
- The health consequences of chemical incidents (e.g., accidental exposure to chemicals typically related to industrial practices) vary depending on several factors, such as the nature of the chemicals in question, the duration of exposure, the dose, and so on. Chemical incidents can cause everything from skin or eye irritation to depression of the central nervous system and mental health issues.[84,85] These effects can be acute or chronic, and exposure could trigger the onset of other common diseases that vary in severity down the line, such as cancers and asthma.[86-90]
- Data available from 171 countries around the world showed an average of 1.7 mass shooters per country from 1966 – 2012.[91] Mass shooting events occur in many countries, but 31% occurred in the United States during this span of years. This data also shows that the United States had by far the highest number of mass shooters, with 90 offenders, followed by the Philippines, Russia, Yemen and France.[91]
- There are dozens of disease outbreaks (e.g., Diphtheria, Ebola, COVID-19) occurring globally at any given time, and in an increasingly connected world, a disease from an isolated, rural village can move to a major city within 36 hours.[92-94]
- COVID-19, a respiratory disease that is caused by the novel coronavirus SARS-CoV-2, was first documented in 2019 and spread globally, becoming a pandemic in 2020.[93] In May 2020, 188 countries had confirmed cases of COVID-19, with each person infected spreading it to, on average, 2-3 other individuals.[95,96]
  - The impact of COVID-19 across countries and regions has varied widely, dependent on preparedness and response measures: where early action was taken to rapidly test and isolate positive cases, implement comprehensive contact tracing and quarantine contacts for those who tested positive, regions were able to slow the spread, bring outbreaks under control and minimize secondary mortality.[97]

- o In regions that have seen exponential growth in transmission, new emergency response measures have been put in place to enforce physical distancing and movement restrictions in order to slow the spread; however, such isolating measures have contributed to severe economic downturn and profound mental health repercussions, while disadvantaged groups who are unable to physically distance or seek health services have been disproportionately impacted by the disease.[97]
  - o While the evidence is still emerging as of June 2020, according to the WHO there is urgent need to control the pandemic by maintaining current response strategies and to carefully plan for a phased transition away from current measures to avoid resurgence in COVID-19 transmission.[97]

HEALTH PROMOTION BENEFITS AND STRATEGIES
- Disaster events are unpredictable, sometimes inevitable, and can happen at any time, in any place.[98] In most disaster events, victims are affected instantly. Chemicals or biological toxins can exert health effects immediately upon exposure; each minute that passes after cardiac arrest without intervention decreases the chance of survival by 10%; and most active shooter events last less than 15 minutes.[99-101] All of this means a rapid, efficient response is necessary in times of crisis, and that there is a strong need to consider and plan a response protocol.
  - o During a terrorist attack at the World Trade Center in 1993, it took an investment banking company four hours to evacuate employees from the building, requiring some to walk down more than 60 flights of stairs. This prompted the company's reevaluation of emergency response plans and the company ran drills to practice new procedures. When the Sept. 11, 2001, terrorist attack on the World Trade Center occurred, the company was able to evacuate 3,800 employees within 45 minutes.[102]
- Leading emergency management institutions such as the World Health Organization (WHO) and Federal Emergency Management Administration (FEMA) consider a risk assessment (also known as a vulnerability, hazard or threat assessment) as an essential step in effective emergency response, since it helps identify resource gaps and anticipates the short- and long-term impact of hazards on different groups; it can, therefore, inform strategies for reducing disaster vulnerability, increasing resilience and carrying out emergency preparedness and response measures more quickly and effectively.[77]
- The WHO, FEMA and other leading groups such as the American Red Cross also recommend practicing emergency drills, and having a clear communication plan in place to convey emergency response protocols at the time of an emergency, to help organizations appropriately and efficiently execute their emergency response plans.[103]
- Especially with disease outbreak management, planning is necessary for effective communication, but this holds for other emergencies as well.[98] The WHO recommends that response strategies should include early and transparent announcements covering the situation and leadership consensus on any limits on transparency and other communication protocols before a crisis occurs.[98]

ADDITIONAL NOTES
- Compared to people living in high-income countries, people living in low-income countries are seven times more likely to die and six times more likely to be injured, displaced or require emergency assistance when a natural disaster strikes.[104]
- Natural disasters force an estimated 26 million people around the world every year into poverty.[105]
- Research also suggests that both in the case of natural disasters and cardiac events, people are differentially affected depending on factors like socioeconomic status, race and gender.[106-112]

FEATURE C04: OCCUPANT SURVEY

OVERVIEW
Part 1: Select an occupant survey that allows measurement of common building characteristics, health- and well-being-related factors and sociodemographic information using a third-party or custom survey.
Part 2: Administer the survey using techniques to protect participant-identifying data, analyze and report results.

SCIENTIFIC BACKGROUND
- Survey research is the collection of data from a sample of individuals based on their answers to questions.[113] Surveys are often interpreted generally to mean questionnaires, but survey research in fact refers to a variety of research aims, sampling and recruitment strategies, data collection instruments, and methods of survey administration and analysis.[113]
- Survey research can capture both quantitative data through psychometric tools or rating scales, as well as qualitative data (i.e. open-ended questions, such as "do you have any additional comments?").[114] Survey data is collected using self-reported measures that rely on respondents' knowledge and perceptions and is referred to as subjective research.[115]
- Common goals of surveys in health and social science research are to capture the prevalence of certain conditions in a population, assess the effectiveness and impacts of interventions, and provide insight on potential relationships between two or more variables (e.g. between air quality and comfort).[115,116]
- Surveys also capture what cannot be captured from objective research, including respondents' thoughts, feelings, attitudes and self-reported behaviors.[114]
- Monitoring building environmental parameters alone (e.g., indoor air quality) is called objective research and is typically not sufficient to accurately or deeply understand occupant experiences and related health effects.[117-119]
  - This is particularly true as human perceptions of concepts like "comfort" are a highly subjective phenomenon that can vary as a function of individual physiological differences and behavioral and psychological factors.[120-123]
- Survey research can also be combined with other tools or measures such as behavioral measures, in which respondents' behavior is observed and recorded in both natural settings and structured laboratory tasks (often used for productivity studies).[124,125]
- Surveys that measure thoughts, feelings, attitudes and behaviors can use a variety of measurements, including rating scales to assess attitudes (e.g., Likert Scale) and items (i.e., questions) that, when combined in a certain order, accurately reflect the psychological construct they are intended to assess.[115]
  - Psychological constructs include personality traits, emotional states, attitudes, abilities and other variables that are difficult to measure.[114,126] Researchers continually test and revise the conceptual definitions of their constructs, which influence the items - or questions - included in a survey .[114]
  - When evaluating a measurement method, psychologists consider reliability and validity.
  - Reliability refers to the consistency of a measure – that is, where the measure is consistent across time, both internally (i.e., people's responses are consistent across a multiple-item measure of the same construct) and between researchers' interpretations.[114,127,128]
  - Validity is the extent to which the scores from a measure represent the variable they are intended to measure.[114,127,129]

KEY HEALTH AND WELL-BEING EFFECTS
- Surveys are a well-established research method that can provide information on a population of interest through the use of data collected from a subset (i.e., sample) of that population.[130]
- The relationship between the physical parameters of the environment and occupant satisfaction is complex and may interact to influence occupant outcomes.[131]
- Post-occupancy surveys are a method for building designers, building owners and facilities managers to assess building conditions and receive feedback to identify areas that require improvement or could otherwise promote greater comfort or satisfaction for occupants.[132]

- Data from post-occupancy surveys can be an effective tool to link building conditions with occupant outcomes that matter to projects. A recent study linked higher CO_2 levels to poorer cognitive function scores in a controlled environment office space.[133]
- Post-occupancy surveys can also be used to get feedback on why a program may not be working or used by employees. For example, several studies suggest that employees may underutilize available mental healthcare services for fear of stigma in the workplace.[134-136]

HEALTH PROMOTION BENEFITS AND STRATEGIES
- There are several key implementation and analysis considerations when conducting survey research.
    - (1) Sampling. Sampling is a critical part of conducting surveys and can have a significant impact on the usefulness and accuracy of findings. Ideally, sample groups should be large and selected in a randomized methodology so that the data collected can most appropriately reflect the conditions and experiences of the entire population of interest, as opposed to those of the individuals who are most likely to provide feedback or are most convenient to poll (i.e., a convenience sample).[113,126]
    - This is not always possible in a building-level study, so attempts should be made to get a sample that is as representative (i.e., the sample responding to the survey resembles the population of the building) as possible.[137]
    - (2) Response Rate. Strategies to achieve higher response rates include designing questions to be concise and easily understood and sending reminders to respondents to complete surveys.[138] Offering respondents insights on results after survey completion is another way to improve response rates to questionnaires.[139]
    - (3) Consent and privacy. Informed consent and issues of privacy and confidentiality are basic principles of ethical research conduct.[140] Best practice includes informing participants of the main research goals, providing contact information for the principal investigator and a strict assurance and outlining of the procedures to maintain confidentiality and data storage protocols.[140,141]
- There are two main types of statistical analysis that are impacted by the way researchers recruit participants: descriptive statistics summarize and organize the data collected, while inferential statistics provide insight on a population using data collected from a representative sample of that population.[115,138,142,143]
    - Common ways of describing and organizing the data include frequency tables (which show the way the data is distributed across variables), the mean (average), median (middle value) and mode (most frequent score).[130]
    - Common statistical analyses that researchers use include correlations to determine whether two variables of interest are related and means comparisons, such as t-tests or ANOVA to compare groups on particular variables.[130]
    - Researchers use various statistical tools to design and make sense of the findings from statistical tests. Some of the most important are statistical significance (a value researchers use to determine if the findings are real versus spurious), power (the likelihood that a study will detect an effect that actually exists) and effect size (a standardized measure of the strength or magnitude of the effect which allows researchers to communicate the practical consequences of their findings).[130,144-146]
- Using third-party surveys and third-party expert analysis enhances the likelihood that an administered survey is measuring its intended subject.[147] Third-party providers can also help improve credibility of the results, enable benchmarking (or comparison) across similar projects, and help participants feel that their responses are confidential, encouraging a higher response rate.[148]

ADDITIONAL NOTES
- Survey measures are often developed and validated in English-speaking countries and must be assessed for reliability and validity in new populations when translated for multicultural and international populations.[149] Cross-cultural applicability must therefore be tested to evaluate if such tools can be equally discerning across different countries and population groups.
- Tools should also be tested for certain contexts or populations. For example, few health-screening tools have been developed for low-to-middle-income populations.[150]

FEATURE C05: ENHANCED OCCUPANT SURVEY

OVERVIEW

Part 1: Select a third-party survey and add customized questions to evaluate more in-depth occupant health and well-being information.

Part 2: Administer a pre-occupancy survey using a third-party provider and compare results against a post-occupancy survey.

Part 3: Implement a plan that identifies satisfaction thresholds for post-occupancy survey responses and utilizes strategies for improving unmet thresholds.

Part 4: Identify a professional experienced in qualitative research to conduct interviews, focus groups and/or observation and analyze results.

SCIENTIFIC BACKGROUND

- Survey research is the collection of data from a sample of individuals based on their answers to questions.[113]
- Survey research can capture both quantitative data through psychometric tools or rating scales, as well as qualitative data (i.e., open-ended questions).[114] As survey data is collected using self-reported measures that rely on respondents' knowledge and perceptions, it is referred to as subjective research.[115]
- Pre-occupancy surveys can be used to learn about occupant expectations, needs and desires, preconceptions, and behaviors, identify areas for occupant education and enable occupant input to influence design decisions.[151,152] Post-occupancy surveys can then measure the success of the interventions and identify potential areas for improvement in design, policy or operations.[153]
- While surveys encompass both quantitative and qualitative tools, the vast majority focus on quantitative data and follow a positivist research framework. This framework is based in the scientific method and assumes or aims for a value-free and objective science that seeks knowledge of universal truths that are knowable and quantifiable through the "right" methods and tools.[154]
- Qualitative research is focused on the how, why and what of a phenomenon and looks for the meaning people attribute to their experiences and situations. It explores the feelings, emotions, attitudes, perceptions and cognitions that may not be well captured by surveys.[155]
  - By allowing people to frame their experiences in their own words and by emphasizing a diversity of voices, qualitative research can be an effective tool for listening to how diverse racial and ethnic group members - and subjugated groups - give voice to their own lived experiences, which often differ from those in positions of power.[156,157]
- There are three main types of qualitative research.
  - (1) Exploratory. Investigates emerging and under-researched topics.[157]
  - (2) Descriptive. Uses "thick" descriptions to describe the social lived experience.[157]
  - (3) Explanatory. Explains social phenomena and the relationship between different parts of a topic.[157]
- Qualitative researchers tend to use a post-positivism framework that assumes human nature is complex, multidimensional, situated and relational, and that there is rarely a single cause and effect relationship behind human behavior.[158,159] They seek a deeper understanding of the social and cultural context in which people live.[160-162] For example, people can have overlapping and conflicting identities that influence their behavior and perceptions such as doctor, mother, wife, daughter, immigrant and citizen, that are difficult to capture in quantitative survey work.[159]
- Common qualitative methods include interviews; focus groups; ethnographies; and observation, which is common in architectural and design work.[162,163]
- Semi-structured or unstructured interviews allow for the probing and clarification of participant responses and the exploration of tangential areas that arise.[164]
- Focus groups are typically used to gain an understanding of how people feel about a particular issue and typically include 6-10 participants. Because group dynamics can influence the discussion, focus groups should avoid power differentials (i.e., bosses and direct reports).[162]
  - Focus groups highlight social interaction and common experience, reveal conflicting opinions and implicit shared and common knowledge (especially with culturally diverse populations) and allow participants to co-create the research data.[162,165-167]
  - Focus groups may be less useful when dealing with a sensitive issue, as people may be reluctant to voice their experiences in a group setting.[162]

- Observation is non-experimental research in which people's behavior is systematically observed and recorded. The goal in observational research is to obtain a snapshot of an individual, group or setting and the interactions between them.[168]
  - The main types of observation used in built environment research include naturalistic observation (i.e., observing people in their typical environment, also called field research) and structured observation, such as in a laboratory or modified natural environment.[168]
- Triangulation, or the use of multiple methods in research, can strengthen research conclusions, reduce possible errors in measurement or participant response, tailor design interventions to the specific population and provide deeper insight into the "why" on research results.[169]
- Combining qualitative and quantitative research methods can allow for the power of the general (i.e., survey work) with the insight and nuance of the particular (i.e., interviews).[170]

KEY HEALTH AND WELL-BEING EFFECTS
- Mixed method approaches can give a more holistic understanding of the interactions between buildings and occupants and possible health and performance outcomes.[170]
- Using both pre-occupancy and post-occupancy surveys allows researchers to pinpoint the intervention in question as a possible explanation for any changes seen before and after the intervention.[153]
  - The American Society of Interior Design did pre- and post-occupancy evaluations of their WELL Certified headquarters in Washington, D.C. They found that collaborative work increased by 9% after working in their new office for 15 months and satisfaction with air quality increased by 110%.[171]
- Interviews, focus groups and observation can help answer why something is happening and give context to the quantitative data from surveys.
  - Survey research on the perceptions of office workers on green roofs found that 80% of participants believed nearby nature was important to their health and well-being, and 80% of participants felt that green roofs were part of nature. However, only slightly more than half thought the green roof visible from their office building impacted their health. Interviews revealed that participants were unsure on how to quantify the impact of one green roof on their physical health, but they felt the green roof strongly impacted their well-being, ability to focus and creative problem solving.[172,173]

HEALTH PROMOTION BENEFITS AND STRATEGIES
- In conducting qualitative research, key implementation considerations include sampling and response rate, analysis and informed consent:
  - (1) Sampling and response rate. In qualitative research, sampling is usually purposeful. In other words, the researcher selects participants who represent the group to be studied, aiming for a reasonable cross-section of people.[174]
  - Key sampling methods include snowball (i.e., where participants recruit other participants), theoretical (i.e., to gather data for the generation of theory) and stratified, purposeful sampling (i.e., wanting to target certain groups).[174-177] Snowball sampling is particularly useful when the target population is hard to reach.
  - Interviews should be conducted until the same themes are heard over and over, called saturation. Approximately 30 participants is considered the minimum for saturation for most qualitative work.[148,178]
  - (2) Analysis. Qualitative researchers should practice reflexivity, a process by which they recognize, examine and understand how their social background, location and assumptions can influence the research. Reflexivity is a way to account for their personal biases and examine the effects that these biases may have on the data produced.[154]
  - In qualitative research validity, or credibility, means ensuring that the findings are accurate from the perspective of the participants. Some ways to help attain accuracy include using questions that are relevant to the goals of the project, triangulation, member checking, rich description, transferability (i.e., the degree to which findings might fit within contexts outside the study), the use of negative cases and external review of the results.[148,162,179]
  - (3) Consent. Informed consent, privacy and confidentiality are basic principles of ethical research conduct.[140] Best practices include informing participants of the main research goals, providing contact information for the principal investigator and a strict assurance and outlining of the procedures to protect confidentiality and data storage protocols.[140,141,148,162]

ADDITIONAL NOTES

- Lessons learned from qualitative research that aims to support social justice causes, such as feminism and post-colonialism, can be useful to study subjugated groups who are less represented in research and to identify differences between the intent of the law and how it is practiced. For example, while sexual harassment policies aim to prevent and mitigate sexual harassment, there may be negative repercussions against victims who report sexual harassment incidents.[154]

FEATURE C06: HEALTH SERVICES AND BENEFITS

OVERVIEW

Part 1: Provide a comprehensive health benefits plan, including essential health care and services at no or subsidized cost, and offer confidential benefits consultation.

Part 2: Offer on-site or immediately accessible medical treatment by qualified healthcare providers with a scheduling system and a policy that allows appointments during business hours as needed.

Part 3: Implement a seasonal flu prevention and education campaign and provide on-site flu vaccines or flu vaccine coverage.

SCIENTIFIC BACKGROUND

- There are four main models for health care systems around the world: the Beveridge model, the Bismarck model, the national health insurance model and the out-of-pocket model.[180]
    - (1) The Beveridge model features single-payer insurance, where health care is financed and largely provided by the government through taxes (e.g., the United Kingdom, Spain, New Zealand).[180]
    - (2) The Bismarck model is more decentralized and features social health insurance, wherein employers and employees jointly fund health insurance through payroll deductions for "sickness funds" (e.g., Germany, Japan, the Netherlands, France, Switzerland).[180]
    - (3) The national health insurance model is another single-payer system that incorporates aspects of both the Beveridge and Bismarckian systems, using private providers with payment coming from a government-run insurance program that citizens pay into (e.g., Canada, Taiwan, South Korea).[180]
    - (4) The out-of-pocket model is driven primarily by individual income level, and people pay out-of-pocket for services if they can afford it (e.g., China, India, South America).[180] If prices are prohibitive to care, people are often left untreated or rely on traditional medicine alone.[180]
- Health coverage in countries with health insurance systems (mostly industrialized nations) is treated variously as either a right of labor or a constitutional or human right. Most industrialized countries offer some form of universal coverage to help ensure all members of society can access and use necessary health services without running the risk of financial ruin.[181]
    - The United States is one of several exceptions to this as it features a fragmented system of coverage drawing from a mix of all four models depending on age, income level, employment status or veteran status.[182]
- Vaccines are inactive (killed) or attenuated (weakened) microorganisms that cause certain diseases and are introduced to the body to stimulate the natural immune response, triggering the creation of antibodies that then can fight the disease if encountered later in active or potent form.[183]
- Seasonal influenza has four types of viruses.[184] Influenza virus A and B (which have further sub-types) are the two types that cause seasonal outbreaks of the flu in human populations.[184,185]
- Every season there may be new strains of the influenza virus. The efficacy of a vaccine is contingent upon a number of factors, including how many doses (as applicable) of the vaccine are received and how well-matched the virus in the vaccine is to the virus in circulation. Immunity to one type or sub-type of influenza offers no or only limited protection against other types or sub-types.[185] Additionally, some vaccines are single-dose and others are multi-dose.[185] This is why it is important to receive flu vaccines every year: vaccine efficacy varies season to season and from context to context.[186,187]

KEY HEALTH AND WELL-BEING EFFECTS

- In countries such as the United States, uninsured people are less likely to have a regular source of care and are more likely to delay care even when sick or injured.[188,189] Lack of insurance is also associated with poorer overall health status and an increased risk of death.[190-192]
- Missed or delayed medical care is associated with excess morbidity and mortality, and a greater severity of illness.[193] Delayed care is particularly harmful in the case of diseases like cancer, where early detection is critical for healthy outcomes and proper disease management.[194,195]
- People without health insurance coverage in countries such as the United States are less likely to receive necessary inpatient and outpatient medical services, resulting in poorer patient outcomes.[196-200]

- One study found that sick newborns without insurance received fewer inpatient services compared to other newborns, despite no differences in medical need.[201] Another found that uninsured hospital patients were at greater risk of medical injury from substandard care.[202]
- Globally, on average, governments provide 51% of financing for their health systems. Yet 35% of health expenses come from out of pocket expenditures. This health care burden annually forces 100 million people into extreme poverty.[203]
- In the Netherlands, all legal residents must buy individual private health insurance and will be accepted regardless of pre-existing conditions.[204] The system is viewed as affordable (averaging $1,615 annually) and in 2016 ranked third in the global Health Care Access and Quality Index (value of 96.1.[205,206]
- In countries such as India, the healthcare burden persists. 25% percent of patients who have to pay out of pocket for a hospitalized stay are cast below the poverty line due to their hospitalization.[207] Furthermore, 71% of reported healthcare expenditures are cited as out-of-pocket payments, demonstrating the severity of financial stress on the general population.[208]
- Vaccines are one of the most cost-effective ways to prevent disease, saving an estimated 2-3 million lives per year.[209] A further 1.5 million lives could be saved with improved worldwide coverage of vaccinations.[209]
- The flu can make people seriously ill and, in some cases, even results in death, especially for adults over the age of 65, children under the age of two and people with other medical conditions that can be complicated by the flu.[185] As with any disease, the best way to address the flu is to prevent it, and annual vaccinations are the primary way to prevent both the flu and its related complications.[185,210]
  - Studies suggest that adults over 65 may have diminished antibody responses to flu vaccines, suggesting a need to develop different vaccine types for this community.[187,211,212] However, vaccination is still considered effective for protecting older populations against the flu.[213,214]

HEALTH PROMOTION BENEFITS AND STRATEGIES
- In the United States, insurance coverage promotes greater utilization of preventative health services, reduces risk through behavioral changes, and improves disease management.[215-217]
- Insurance is linked to better access to and utilization of health care services overall.[218,219]
- Screenings are a critical part of preventive health care. They facilitate the early detection of disease in people who may otherwise appear healthy and can help individuals more immediately treat and manage any conditions needing medical attention.[220]
  - While there are substantial benefits to screening, it is important to follow clinical guidelines for appropriate screenings. In some cases, screenings can lead to over-diagnosis and unnecessary treatment, and avoidable psychological distress. This was demonstrated to be the case with breast cancer screenings, wherein screening frequency guidelines were modified based on research including a Cochrane Systematic Review that estimated that for every 2,000 women screened for breast cancer over a span of 10 years, one would avoid early mortality and 10 healthy women experienced false positive findings.[221,222]
- Even in countries with universal health insurance systems, prescription drugs may not always be covered.[223] Including prescription drug coverage and minimizing caps on drug insurance helps to remove a potentially significant barrier to accessing necessary medication and can improve patient outcomes.[224,225]
- On-site workplace clinics are an increasingly popular way to provide both preventative care and treatment to employees, including more convenient treatment of any acute conditions that otherwise would require potentially time-consuming trips off-site to seek medical care.[226,227]
  - School-based health clinics have been shown to reduce annual healthcare costs by 15% and decrease rates of teacher absenteeism.[228]
  - More evidence is needed to assess the impact of on-site clinics in workplaces. For example, such clinics have the potential to reduce costs associated with care for both patients and employers, but further research on well-designed and well-implemented workplace clinics is needed to identify any return on investment and any conferred health benefits.[227]
- Misinformation related to disease pathology and low health literacy can contribute to reduced rates of preventative care utilization, such as with vaccinations. Removing cost and lack of knowledge or information as barriers to obtaining vaccines can significantly increase the number of people who get immunizations, serving to help protect both the individual and the community at-large by supporting efforts toward herd immunity.[229-231]

- Herd immunity refers to when a community as a whole can resist a contagious disease because a large enough proportion of that community is immune — whether because they are vaccinated or have already contracted the disease — making it highly unlikely that anyone who is not yet immune (such as infants or people who cannot get vaccinated because they have compromised immune systems) will be exposed, thereby slowing or effectively ending the spread of the disease in the population.[232-237]
  - The herd immunity threshold (i.e., the proportion of the population that needs to be immune to achieve herd immunity) varies by disease, based on factors such as ease of disease transmission across persons and how long the disease or the immunity lasts. But the threshold is typically very high, ranging from 75% to 95% of the population.[238]
- Research spanning several countries has demonstrated that the workplace can be an effective setting to increase rates of vaccination, particularly through on-site, free or reduced-cost administrations that are well-promoted with the provision of reliable information in the workplace.[239-243]
  - One study in the United States found that those who received the flu vaccine had 43% fewer days of sick leave compared to those who did not.[244]

ADDITIONAL NOTES
- Much of the research on the health effects associated with health coverage derive from the United States. This may be due to its unique position as one of the few developed nations in the world (next to some Balkan states and Belarus) lacking universal health care, resulting in large, comparable groups who are uninsured, insured through a public program (e.g., Medicare or Medicaid) and/or insured through private insurance.
- Achieving universal health coverage for all is a key goal promoted by the World Health Organization.[245] Health coverage addresses a crucial potential barrier to health care by limiting financial burden. However, there are several other potential barriers to health care utilization that must also be addressed to truly facilitate equal access to health care for all. These include health beliefs, vaccine hesitancy, cultural practices, language, social networks and the landscape of actually available and accessible services and qualified medical professionals.[246-249]

FEATURE C07: ENHANCED HEALTH AND WELLNESS PROMOTION

OVERVIEW
Part 1: Support a culture of health through quarterly health programs and monthly educational communications and implement internal health promotion coordinators to organize programming.
Part 2: Dedicate at least one executive-level employee to plan and oversee the implementation of health promotion programs.

SCIENTIFIC BACKGROUND
- In 2014, the Robert Wood Johnson Foundation launched an initiative to cultivate a "culture of health," advancing a vision for society founded on the prioritization of health, principles of health equity and equal access for all to the opportunity to lead healthy lives.[250,251] This concept focuses on building a culture that places central value on health and on systems that readily facilitate the pursuit and achievement of healthy lifestyles. The idea of building a "culture of health" has become a key foundation for organizational health policies and programming.
- An organizational culture of health helps the members of the organization adopt fewer unhealthy behaviors and can result in fewer illnesses affecting the community overall.[252] A culture of health is achieved when the overarching identity of an organization — at every level — is one that values the health of its members.[253]

KEY HEALTH AND WELL-BEING EFFECTS
- Organizational health and wellness interventions may support reductions in negative health outcomes, such as rates of absenteeism, and can create cost savings up to $10 for every $1 invested.[254] In a meta-analysis of the economic impact of implementing workplace health promotion programs in the United States, participating employers saw average reductions in sick leave, health plan costs and workers' compensation and disability insurance costs of about 25%.[255]
  - One study investigating outcomes across nearly three dozen studies spanning 10 years of data found that there were average reductions of around 25% in sick leave and costs associated with health plans, workers' compensation and disability.[256]
- While a RAND Corporation study found that over 85% of large employers (i.e., with 1,000 or more employees) in the United States offer workplace wellness programs, Gallup research reveals that only 60% of employees at those companies are aware their employer offers a wellness program, and only 24% of employees at companies that offer a workplace wellness program participate.[257,258]
  - A comprehensive review of workplace wellness programs identified that consistent comparison across programs is limited due to a convenience sample of employers with substantial commitment and investment into wellness programs, differential motivation of participants in wellness programs and differences between program participants and nonparticipants. The review also identified priority areas of future research to include contextual factors and program design features that influence program impact, the effect of financial incentives on employee engagement and long-term health impact of wellness programs.[257]

HEALTH PROMOTION BENEFITS AND STRATEGIES
- Strategic and frequent communications are important to promote health programming and encourage active participation. Electronic communications may be a good option in terms of feasibility, broad reach and employee acceptance.[259]
  - A review of several studies indicates that strong, effective communications include a communication plan that is comprehensive and integrated into broader programming, with multiple messages delivered through a range of channels and tailored to the specific audience.[260]
- Financial incentives have been shown to be effective in promoting healthy behaviors, specifically by encouraging people to adopt healthier behaviors (e.g., abstaining from tobacco use) or to participate in screenings or Health Risk Assessments (HRAs), a tool used to evaluate an individual's health by determining health risks and habits.[260-264]
  - With HRAs, for example, there may be a relationship between incentive value and organizational commitment. The higher the level of organizational commitment, the smaller the financial incentive needs to be to compel engagement in preventive actions and vice versa.[265]

- Effective incentives are not limited to financial rewards — anything that encourages or compels certain behavior can act as an incentive, and studies demonstrate that non-financial incentives such as paid leave time or fitness wearables can sometimes be as powerful as financial rewards in driving engagement in wellness programming.[266,267]
- Leadership commitment to and active participation in wellness programming consistently appears across the literature as the top predictor of employee engagement in wellness programming.[268-273] Leadership includes executives as well as other senior- and mid-level management. A show of commitment to healthy behavior and health program engagement from these individuals is a strong driver of the overall culture of health in an organization.[268-273]
  - In a study that assessed the differences in engagement rates and risk reductions between a range of "best" and "common" practice health programs, best practice programs found strategies such as strong management support and dedicated onsite staff important in cultivating higher engagement with health programs.[271]
  - Best practice and common practice rankings were determined via an organization's overall score on the nine criteria metrics, with a range of 7-22 (lowest to highest) points, with highest scorers deemed as "best practice."[271]
  - Programs were considered "best practice" if they were comprehensively designed to meet the needs of the target participants, integrate population-based interventions, engage organizational decision-makers and create an ecosystem of transparent communication, relevant programming and access to care.[271]
  - In organizations that adhered to "best practices," health assessment participation rates were 144% higher and health coaching participation was 141% higher compared to "common practice" programs.[271] These results demonstrate that engagement at the leadership level and integration of health into an organization's workplace culture result in improved health outcomes for employees and organizational-level health risk reduction.
- Some studies further recommend the establishment of wellness committees that plan and execute events and advocate for health-promoting design and policy changes.[274-277]

FEATURE C08: NEW PARENT SUPPORT

OVERVIEW

Part 1: Offer paid parental leave for use during pregnancies, after birth, during the adoption of a child, or when fostering children, and provide supportive services to facilitate a smoother transition back to work for employees returning from leave.

SCIENTIFIC BACKGROUND

- Every day, approximately 830 maternal deaths globally are related to pregnancy and childbirth, most of which are due to preventable causes.[278,279] This speaks to a need to provide mothers with proper care and support before, during and after childbirth to support safer and healthier pregnancies and births.
    - Maternal deaths include deaths during pregnancy or within 42 days of pregnancy termination, regardless of pregnancy duration. It does not include deaths from accidental or incidental causes.[279]
    - Global maternal mortality overall is on the decline. By 2015, the figures had dropped by 44% over the preceding 25 years.[278]
- According to data from the Organisation for Economic Co-operation and Development (OECD) on 27 (mostly developed) countries around the world, an average of 56.6% of women with children under the age of two work.[280] A significant sector of the workforce is made up of new parents, so it is critical to structure the workplace as an environment supportive of working parents and of their needs to balance work with the challenging responsibilities of parenting.
- A large body of evidence shows that the time parents (both mothers and fathers; both biological parents or other caregivers) spend with children, especially in the first few weeks, months and years of a child's life, is crucial for the health and well-being of both parent and child.[281,282] This is related to a number of factors, including parent-infant bonding and attachment, the role of the hormone oxytocin and the ease and likelihood of mothers starting and sustaining breastfeeding.[281-287]
    - Oxytocin, known sometimes as the "love hormone," is produced and secreted in different parts of the brain and facilitates pro-social behaviors such as bonding and attachment. For infants, receiving affection, particularly in the form of physical touch in the first several weeks and months of life, is vital to healthy development and correlated with mental and physical health outcomes later in life, such as mood or anxiety disorders and depression.[281,282,287,288]

KEY HEALTH AND WELL-BEING EFFECTS

- The first three years of a child's life are particularly important for brain development, and several studies indicate that the cognitive, physical, mental and emotional development that a child goes through during these early stages of life can have a lasting impact on future health and well-being, educational attainment levels, income and other elements related to socioeconomic status.[288-292] Therefore, workplace policies that support a parent's ability to be present and focus on child-rearing, particularly within the first year of a child's life, can go a long way to support the health of both new parents and their developing children.
    - Immunization rates increase when parents can take leave: A higher number of full-time equivalent weeks of paid leave is associated with higher rates of childhood vaccination.[293] One study reported that the likelihood of a child receiving vaccines to protect against measles and polio increase by more than 20% in cases when mothers can take paid leave for longer than 12 weeks.[294]
- The World Health Organization recommends that women breastfeed exclusively for six months (or 24 weeks) for the health of both mother and child.[295] The number of women who breastfeed exclusively for this length of time can increase by up to 9% when mothers are able to take leave from work for up to 3.5 months, and the same study notes that the length of time women breastfed increased by approximately ten days for every additional month away from work.[296]
- Although much of the research on parent-child attachment focuses on mothers, a nascent and growing body of research supports the significance of father-child bonding. Studies suggest that bonding between fathers and infants can play a critical role in the child's future emotional and social development, including potentially helping children experience fewer behavioral problems and more reciprocated friendships later in life.[297-301]

HEALTH PROMOTION BENEFITS AND STRATEGIES

- Comparing across 141 different countries that ranged from zero full-time equivalent weeks of paid leave to 86 full-time equivalent weeks of paid leave, ten more full-time-equivalent weeks of paid parental leave is correlated with a 10% reduction in neonatal and infant mortality rates, and a 9% reduction in mortality rates of children under five years of age.[283]

- Studies suggest that women with maternity leave between 15 and 24 weeks experience improved mental health (in terms of depression, anxiety and life satisfaction) compared to women with maternity leave less than nine weeks.[302-304]

- Parental leave taken by fathers can help address concerns of gender equality in childcare. Some studies suggest that paternity leave can improve a father's emotional investment in connecting with children.[305,306]
    - Robust parental leave policies can help mitigate the "child penalty" – i.e., the percentage that women fall behind men in work earnings due to raising children.[307] Spanning their entire career, women with children experience a nearly 20% decrease in earnings, compared to their male counterparts, with little improvement seen over the decades even as women have increased their education levels and job-specific experiences.[307,308] Major contributors to this disparity include lack of ability for new mothers to participate in the labor force, wage rates, inflexible working hours and a shift in job selection to employers that provide parental support policies.[307]

- In comparing paid leave of various durations across several countries, providing at least 40 weeks of paid leave is recommended. Paid leave of this duration was found to be associated with a 15% reduction in child mortality.[309,310]

- Parental leave policies that allow leave for up to a year (i.e., 52 weeks) may be able to improve job continuity and increase rates of employment for women without introducing negative impacts on earning potential or career advancement.[311] To further support equal career advancement, parental leave policies can be divided between parents to split the time spent out of the workforce.[307]

- Employee retention is directly tied to organizational support for parents returning to work after leave, including things such as social support from co-workers and managers, lengthier leave time and the elimination of overtime hours for new mothers.[312-314]

ADDITIONAL NOTES

- Policies that enable new parents to take leave from work to focus on childcare without fear of compromising their family's economic security are particularly important in countries where such policies are not standard or nationally mandated. The United States is one of only a handful of countries, and the only high-income country, that does not have a formal, national policy that guarantees new parents paid time off.[310] Further, same-sex parents and reconstituted families experience varying levels of legal coverage compared to traditional family units.[315]

- As rights and representation for non-traditional families (specifically same-sex couples) vary from country to country and are linked to their legal rights to become parents, policies and support range widely, and thus further disjoint access to universal parental leave policies.[315]

- Almost all maternal deaths occur in developing countries.
    - In 2015, there were 239 maternal deaths per 100,000 live births in developing countries compared to 12 maternal deaths per 100,000 live births in developed countries.
    - Therefore, health and well-being interventions of all kinds aimed at improving maternal health should especially be pursued in developing countries.
    - Within any country, practitioners should consider the disparities in maternal mortality ratio between low- and high-income families, families in rural versus urban environments, and families of different race and ethnicity.[278,316]

FEATURE C09: NEW MOTHER SUPPORT

OVERVIEW
Part 1: Provide breastfeeding support in the workplace through paid breaks, counseling and breast pump coverage, and provide accommodations to support breastfeeding while traveling for business.
Part 2: Provide a dedicated lactation room that meets best practice specifications and is designed to address user needs.

SCIENTIFIC BACKGROUND
- The World Health Organization (WHO) recommends exclusive breastfeeding (i.e., no other food or drink, not even water) for the first six months of a child's life for the health of both mother and child.[317] After six months, continued breastfeeding with appropriate complementary foods is recommended up to age two.[318]
- In some countries, even if breastfeeding is initiated at birth, exclusive breastfeeding is not maintained for six months. According to the latest available data, less than 1% of infants are exclusively breastfed for the first six months of life in Finland, Greece, Chad and the United Kingdom.[319]
- Globally, between 2007 and 2014, only an estimated 36% of infants under six months of age were exclusively breastfed.[319]

KEY HEALTH AND WELL-BEING EFFECTS
- Every year, if breastfeeding was scaled to near universal levels, an estimated 823,000 children and 20,000 mothers could be prevented from dying and an estimated $300 billion worldwide could be saved from costs related to issues ranging from diarrheal diseases and respiratory infections in children, to reduced risks of breast and ovarian cancer in mothers.[284,286]
- Regular breastfeeding has been shown to reduce the odds of several infections and illnesses in children, including diarrhea, pneumonia, sudden infant death syndrome, acute lymphocytic leukemia, acute myelogenous leukemia, acute otitis media, gastrointestinal infections, type I diabetes, asthma, hospitalizations from respiratory illnesses and later development of type II diabetes and obesity.[285,320-325]
- There are also many benefits to the mother associated with breastfeeding, including a faster return to pre-pregnancy weight, a reduced risk of breast and ovarian cancer and reduced odds of type II diabetes, metabolic syndrome, cardiovascular disease and obesity.[323,325-330]

HEALTH PROMOTION BENEFITS AND STRATEGIES
- Rates of breastfeeding tend to decrease significantly when mothers return to work; therefore, workplace lactation programs that support breastfeeding are critical to help both mother and child benefit from the positive health impacts of breastfeeding.[70,331-334]
- A comprehensive workplace lactation program that includes supportive policies and amenities such as paid breaks for expressing milk, breast pumps, accessories to transport milk, education and counseling has been shown to not only improve breastfeeding duration (i.e., increase number of weeks or months that mothers breastfeed) but in one study also correspond with a 94.2% employee retention rate for mothers.[335]
- Lactation programs that support breastfeeding have been shown to reduce absenteeism due to a child's illness and to reduce the number of child health insurance claims.[70,336]
  - Cigna, a health insurance company based in the United States, implemented a workplace lactation program that offered breastfeeding support and services before, during and after maternity leave, consultations with a lactation specialist and private on-site breastfeeding rooms with breast pumps. A study by a team at the University of California, Los Angeles evaluated the program, comparing results across women who planned to formula feed (control group 1), planned to breastfeed but chose not to participate in the lactation program (control group 2) and planned to breastfeed and participated in the lactation program (the intervention group). At six months, more than 70% of the women in the intervention group were still breastfeeding, compared to 20% in control group two. And 49% of those women indicated that the lactation program influenced their feeding decisions. In the first year of life, breastfed infants required 62% fewer prescriptions per child compared to infants in control group 1, and finally, mothers in the intervention group had a collective 444 fewer days of absenteeism compared to the control group.[337]

- Qualitative reports indicate that lactation programs can improve employee morale, reduce turnover and decrease stress, thereby improving productivity at work.[331,332,338]
- The World Health Organization recommends that support — both practical and social — is given to new mothers in the form of coaching or counseling to assist those who may be struggling with common issues in expressing milk.[339]

ADDITIONAL NOTES
- In addition to the considerable health benefits associated with breastfeeding, there are also significant estimated economic benefits.[333] In the case of exclusive breastfeeding, families may benefit from cost-savings of up to $1,500 in the first year of the child's life. However, the impact of these savings diminishes if parents must nevertheless invest in other tools or needed supplies such as breast pumps.
- It has been demonstrated that for every $1 invested in facilitating exclusive breastfeeding for the first six months of a child's life, there may be an estimated $35 return on investment (i.e., through educational attainment, workforce participation and lifetime earnings) on a global scale.[338,340,341]

FEATURE C10: FAMILY SUPPORT

OVERVIEW

Part 1: Provide support for childcare through on-site childcare centers or subsidies of at least 50% for off-site childcare, back-up childcare assistance, seasonal childcare programs, flexible work options and/or paid time to care for a child.

Part 2: Offer at least 12 weeks of leave, paid at 75% or higher of the employee's full salary, during any 12-month period to attend to caregiver responsibilities; provide flexible work options or the option to use paid sick time to care for family members or other dependents as needed.

SCIENTIFIC BACKGROUND

- Work-life balance refers to a harmonious interplay between work and family or personal life domains.[342] Some view the concept of work and personal life as distinct domains of life that should necessarily and strictly be separate, whereas others may prefer a more integrated approach.[343,344] Further distinctions arise between views on whether time should be split equally between work and life domains.[345]
  - In a study conducted on supervisors' self-reported perceptions of employees, in countries with less gender-egalitarian societies (i.e., countries with greater gender imbalances), supervisors rated women lower than men in work-life balance attainment.[346] Countries with high ratings of gender egalitarianism observed equivalent ratings for both women and men.[346] This demonstrates that social structure and workplace dynamics in certain regions can be pre-dispositioned to unequal treatment of employees.
- The demands of work and personal life exert two distinct sets of responsibilities and time constraints on an individual. There are several ways to support the needs of both domains, and often times, positive interdependencies can be established.[347,348]
- An increasing number of employees act as caregivers outside of their paid employment, providing care and assistance to friends or family members who may require support due to a wide range of potential physical, mental or cognitive conditions.[349]
  - Estimates from limited available data suggest that there are 3 million caregiver-employees in the United Kingdom, 5.6 million in Canada and 26.1 million in the United States.[350-352]
- The cost of child and infant care in countries such as the United States can create moderate to severe financial burdens. Throughout the United States, infant care costs take up between 10.2%-28.6% of the median family income.[353] The percentage of families in the United States that can afford care in their state ranges from 5%-28.9%, based on the assumption that care costs 7% or less of total family income.[353]
  - The OECD reports that the percentage of employee pay that goes towards childcare is also significantly higher in countries such as New Zealand (37.3%), the United Kingdom (35.7%), Australia (31.1%), and Ireland (27.8%).[354]

KEY HEALTH AND WELL-BEING EFFECTS

- Employees who face difficulties balancing the demands of work and personal life often experience poorer work performance, increased stress and increased risk of various health problems.[355]
- Family care demands can compromise an individual's ability to meet work demands, often differentially affecting career prospects and job status for women compared to men, as women are often more likely to adopt a greater burden of caregiver responsibilities -- particularly with newborns or infants, but with older family members as well.[350,356-359]

HEALTH PROMOTION BENEFITS AND STRATEGIES

- Studies suggest that employees require emotional and instrumental support in complementary fashion to successfully achieve work-life balance.[360] For example, support in childcare arrangements or leave to attend to caretaker duties is necessary for work-life balance, but should also be coupled with emotional support, which can take the form of manager or colleague support.[361,362] Some studies even suggest that informal, emotional support of this kind can influence work-life balance even more than benefits offered to employees.[363]
- For childcare, workplaces can offer on-site childcare services or negotiated arrangements with community facilities, financial support (e.g., childcare vouchers or subsidies) and referral services.[357]

- o In one report, the availability of childcare services decreased staff absenteeism by 20-30%, and reduced staff turnover by 37-60%, supporting satisfaction and retention of staff.[364]
- Different parents may prefer to approach childcare responsibilities in different ways, suggesting that providing a variety of options may allow for accommodation of diverse needs and support the most employees.[365]
- Measures that can help employees balance caregiver duties with work responsibilities include allowing parental, emergency or sick leave to care for children or other family members and flexible work arrangements.[349,357]
- Policies supporting employee leave at the national level range widely.
  - o Currently 19 out of 36 OECD countries provide some capacity of paid family leave for caregiving. Belgium provides the most expansive program, with 52 weeks per worker's lifetime and two months to provide palliative care; Sweden offers 100 days per worker per sick dependent; Poland provides 14 days per year per worker.[366] Many countries do not nationally mandate any time off, such as the United States, the United Kingdom, Switzerland and Turkey.[366]
- Flexible work arrangements can provide employees with opportunities to better manage work and personal life demands.[343,360] Some options include reducing long or overtime work hours, temporarily switching to part-time hours and telework and flexible options that allow different arrival and departure times to/from work.[357] While promising, and often appreciated by employees, studies suggest that flexibility is only as useful as the employee's degree of control over aspects of the job, including time and place of work.[360] Further, flexible work arrangements can often result in the blurring of boundaries between different domains of life, making it more difficult for employees to separate themselves from work.[367]
- Organizational culture, supported by specific protocols and programming, can contribute to organizational compassion and improved work-life balance. The workplace is a critical setting (particularly through managers) to support people with caregiving responsibilities.[349,368]

FEATURE C11: CIVIC ENGAGEMENT

OVERVIEW
Part 1: Support community engagement for all eligible employees through annual paid time off to volunteer, employer-organized volunteer events, matched charitable contributions or public engagement programming.
Part 2: Designate an indoor or outdoor community or meeting space for public use.

SCIENTIFIC BACKGROUND
- Volunteering is defined as any activity that is voluntarily and freely performed for the benefit of others or a cause without monetary or material reward to the volunteer.[369,370]
- A common model for explaining prosocial behaviors such as volunteering and charitable giving refers to the "warm-glow" effect, which describes the positive emotions that arise from acting or giving in service of others.[371]
- Definitions of social cohesion vary across the literature, and the term is often used interchangeably with other terms invoking notions of social support or community connectedness. Overall, social cohesion refers to the extent to which a community or society equitably grants all members opportunities for inclusive participation in common institutions and activities, to promote a sense of belonging and to facilitate equal access to fundamental social and economic rights.[372,373] It is a measure of the disparities, divisions, discrimination and marginalization — or lack thereof — within a community, and the shared values, culture and solidarity that can arise from an orderly, integrated society.[372,374]
- Another dimension of social cohesion is captured by social capital, which is founded on the notion that social networks hold value in society.[375,376] Social capital refers to the strength of social relationships between members of a community or society, which can subsequently lead to greater access to resources through both formal and informal channels.[372]

KEY HEALTH AND WELL-BEING EFFECTS
- Volunteering and utilization of public services such as the library may be associated with higher levels of health literacy.[377] Such activities may be indicative of high civic literacy (i.e., knowledge of ways to participate in society and to initiate change), which can raise an individual's awareness of health issues and facilitate an ability to become engaged in relevant decision-making processes (e.g., supporting/opposing policies or otherwise exerting influence over social, economic or governmental activities).[377,378]
  - Health literacy refers to a person's cognitive and social ability to access, correctly interpret and truly understand basic health information.[1-4] It further involves the ability to identify and access resources needed to actually act on those understandings and make decisions that promote and maintain individual and community health.[1-4]
- A study based on data from high-income countries showed that volunteering was associated with lower mortality rates among older adults.[379]
- Volunteering overall is directed at benefitting others but can also benefit the volunteer. Studies indicate that adult volunteers report higher self-rated health, self-esteem, life-satisfaction, educational and occupational achievement, functional ability and mortality.[370] Among children and adolescents, volunteering may also positively impact academic achievement and reduce the likelihood of engaging in potential problem behaviors that can lead to truancy, drug abuse, arrest, violence and early pregnancy.[370,380,381]
  - Volunteering encourages an individual's connection to their surrounding community, which can broaden the sense of community and connectedness across minority, socioeconomic and gender divides.[382]
- Functional MRI studies demonstrate that charitable giving can activate brain regions that regulate levels of oxytocin and dopamine, which are associated with pleasure and reward.[383-387] Accordingly, studies indicate that giving is associated with happiness.[387-389]
  - The release of hormones such as oxytocin and dopamine in response to behaviors such as charitable giving has been described as both an effect and potential motive for prosocial behaviors (i.e., behaviors performed with the intent of benefiting others).[383-387]
- Public spaces provide a sense of community and grounding for surrounding populations.[390] An influential factor in the usage of a public space is the quality of the site provided, with high quality spaces encouraging higher levels of social interactions with users.[390]

- A sense of community, which involves feelings of membership and emotional connections in a neighborhood, can have an impact on personal coping behaviors and self-rated health and well-being.[391,392]
- Improved social cohesion has been found to have a protective effect against morbidities and mortalities related to cardiovascular disease and stroke, and is associated with improved mental health and general self-rated health overall.[375,393-398]
    - One longitudinal study with nearly 6,000 participants found that each unit increase in neighborhood social cohesion corresponded to a 53% reduction in risk of stroke mortality.[393]
- Elements of social capital, including isolation, integration, quality of relationships and size and diversity of networks, have been consistently shown to decrease risks of mortality in studies across developed nations, particularly related to cardiovascular and mental health.[399-404]
    - One study demonstrated that the risk of death among adults with the fewest social ties was more than twice that of adults with the most social ties.[405]
    - Studies suggest that social capital can have an impact on health and well-being through several mechanisms, including the facilitation of social support, a pathway for social influence, opportunities for social engagement, bonds/attachments to other members of a community and access to goods, services and other resources.[406,407]

HEALTH PROMOTION BENEFITS AND STRATEGIES

- Motives for volunteering can be both altruistic and egoistic, including service as a way of expressing values, understanding others or oneself, raising self-esteem, advancing career opportunities or developing skills, meeting social expectations/norms and escaping or relieving personal negative feelings.[408-410] Studies suggest that matching personal motives to volunteer activity can improve service performance and satisfaction.[411]
- Studies across various types of behaviors show that individuals are more likely to participate in certain behaviors if doing so aligns with the norms of a group or the culture, suggesting that creating an organizational culture of civic engagement where participation in relevant activities is the norm makes it more likely for individuals to engage in prosocial behaviors such as volunteering and charitable giving.[412-414]
- Placemaking – the collaborative process of maximizing the value of shared public spaces – cultivates social interactions between building occupants and surrounding populations, facilitates civic engagement and strengthens community relationships.[415]
    - Reinforcing community engagement has been linked to positive health benefits, such as an increased sense of belonging, increased physical activity and reduced reporting of psychological distress.[415]
- A positive dose-response relationship has been observed between individuals feeling a sense of belonging to their given community and positive health behavior changes.[416] Those who viewed themselves as an active member of their given community were more likely to participate in health-seeking behaviors, such as increased exercise, successful weight management and loss and improved dietary choices.[416]

ADDITIONAL NOTES

- Overall, the majority of available research on the benefits of public open spaces has focused on parks and gardens and related impacts on physical activity, mental health and access to primary health care services - more research is needed to understand if other types of public community spaces likewise contribute to health and if there are specific design considerations that can help create high quality public spaces.[417-426]

FEATURE C12: DIVERSITY AND INCLUSION REPORTING

OVERVIEW

Part 1: Promote a workplace culture of diversity and inclusion through a third-party or custom program that evaluates and reports on organizational practices; make evaluation results publicly available; establish goals to improve diversity and inclusion policies.

SCIENTIFIC BACKGROUND

- Corporate social responsibility (CSR) refers to the social, environmental and economic accountability of an organization and its business operations to the organization's stakeholders and the community at large, focusing on local community needs and their connection to the larger global context.[427]
- The goal of social impact reporting is to ensure an organization acts in an ethical and transparent way that contributes positively to societal health and welfare.[428]
- Third-party transparency and reporting programs can benchmark an organization's performance across a broad range of topics. Benchmarking performance marks a first step in achieving improvements across various metrics.
- Topics commonly addressed by best practice diversity and inclusion policies, or measured by third-party reporting programs, can include activities related to wages (e.g., provision of a living wage, minimum wage, wage equity), gender, racial and ethnic equity (e.g., in hiring, leadership representation, a culture of diversity and inclusivity), supply chain management (e.g., environmental impact of products and services, including of contracted or sub-contracted entities), local community engagement and impact (e.g., support of community activities, proactive engagement in local welfare efforts), ethical internal processes (e.g., conflict resolution, organizational governance, support for freedom of association and collective bargaining) and overall transparency (e.g., board membership, financial performance).[429-432]

KEY HEALTH AND WELL-BEING EFFECTS

- Gender-based differences in wages is a problem around the world.[247] Eliminating gender-based wage gaps can lead to significant improvements in the quality of life of women and families. An analysis in the United States, for example, shows that equal pay for women of the same age, educational attainment level and working the same number of hours as men would result in a 50% reduction in the poverty rate for working women, including benefits to an estimated 25.8 million children accrued through the increased earnings of mothers.[433]
  - Gender pay gaps vary considerably by country. An analysis across member countries of the Organisation for Economic Co-operation and Development (OECD) shows that pay gaps average between 10-20%, with the widest gaps/greatest disparity in East Asian OECD countries and Estonia.[434]
  - Inequitable levels of wealth can place a disproportionate, gender-skewed health burden on women, which can include lacking health insurance and living in poor health or poverty.[435]
- Racial discrimination affects millions of people worldwide, ranging from people of color to ethnic minorities, indigenous peoples and migrant workers.[436] There is large overlap between discrimination and poverty, wherein a history of unequal treatment has contributed to persistent disparities in educational and occupational attainment, which can be addressed in part through more mindful and concerted practices on a systemic level in approaches to organizational employment opportunities and culture.[437] Other minority groups, such as the LGBTQ+ community, experience disproportionate levels of discrimination. While various countries differ in their treatment of the LGBTQ+ community, LGBTQ+ individuals are burdened with potential criminalization for their sexual orientation, restrictions on civil rights and a lack of baseline recognition in society. [438]
- Collective bargaining is a mechanism through which organizations can create real changes in the living and working conditions of workers, particularly those who are vulnerable to discrimination.[436]
  - Collective bargaining occurs through unions and refers to negotiations which occur between employers, employees or one or more employer/worker organizations that define working conditions and regulations for all involved parties.[439] Unionized workers can negotiate for health benefits that represent their needs and offer effective preventative health measures such as primary and evidence-based care.[440]

HEALTH PROMOTION BENEFITS AND STRATEGIES

- One way to measure and improve an organization's CSR and associated metrics is through voluntary participation in social responsibility reporting.[428] Engaging in CSR measurement and reporting is an increasingly popular way for organizations around the world to measure overall performance, operational efficiency and social impact. Approximately 93% of the world's largest companies engage in some form of formal reporting on CSR.[441]
  - The quality of reporting is an important consideration. A review of CSR reporting across several countries in the European Union indicates that reporting quality is typically low, with higher quality reports coming from countries that have introduced mandatory requirements for reporting on a national level (e.g., France, Netherlands).[442] The relationship between quality reporting and actual impact on the organization, employees or the community requires further investigation.
  - Quality is defined by the credibility and relevance of information provided in reports, measured through 11 criteria.[442] Some criteria, for example, include sustainability strategies, trends over time, readability, independent verification and key stakeholders.[442]
- Across several equity reporting programs, the reporting process typically entails a materiality assessment wherein an organization identifies the specific environmental-, social- or governance-related issues that are relevant to the business and/or its stakeholders, assesses internal structures and practices relevant to those topics of material import in the organization, and refines organizational elements or processes to optimize positive impact.[443-448]
- Formal reporting through participation in ethics programs and similar efforts that improve employee perceptions of organizational performance have been associated with positive effects across several employee metrics, including job satisfaction, performance and engagement.[449-455]
  - Key CSR components, such as job satisfaction, have shown positive relationships with overall happiness and life satisfaction.[456]
- Improved CSR is also associated with improved employee commitment and organizational citizenship behavior, or an employee's voluntary participation in organizational activities and tasks outside of job duties.[457-461] This suggests that when organizations demonstrate an effort to go above and beyond a focus on achieving financial goals, employees likewise apply greater effort beyond primary tasks to contribute to the greater good of the organization.[451,462]
- Race-based discrimination in the workplace – which can include discrimination based on race, ethnicity, culture or religion – has been tied to negative health outcomes such as anxiety and depression, as well as lower productivity, trust, morale and satisfaction and higher absenteeism and turnover.[463]
  - Key interventions that have been shown to be effective in reducing race-based discrimination organization-wide include diversity training, support systems such as mentoring programs and resource groups, accountability for diversity in recruitment and top tiers of management, development of resources, policies and procedures to support diversity, established processes for incident reporting and management, systems for gathering and integrating staff feedback, re-evaluation of workplace culture and management styles, transparent development and reporting on diversity goals and modeling anti-discrimination, pro-diversity practices for other organizations.[463]
- Promoting gender equity and reducing gender-based discrimination is also imperative to a functioning workplace ecosystem. Effective steps for promoting gender equity in the workplace include empowering all employees and treating them as equals, regardless of gender, identifying and addressing systemic patterns of gender-based discrimination and implementing anti-discrimination trainings and programming.[464]
- The Human Rights Campaign annually produces the Corporate Equality Index, which outlines essential steps for promoting workforce diversity and inclusion, such as hiring diverse employees, supporting employee financial equality and economic success and providing education on legal rights in the workplace.[465]

FEATURE C13: ACCESSIBILITY AND UNIVERSAL DESIGN

OVERVIEW

Part 1: Implement design strategies that adhere to universal design principles to ensure spaces meet the needs of occupants with all levels of ability in terms of physical access, developmental and intellectual health, wayfinding, operations, technology and safety.

SCIENTIFIC BACKGROUND

- Accessibility refers to the minimum level of design necessary to accommodate people living with the full spectrum of abilities, including physical, cognitive and behavioral.[466]
- Universal Design (UD), also referred to as "inclusive design," is defined as the design of products and environments to be accessed, understood and used by all people to the fullest extent possible regardless of identity or ability, without requiring specialized modifications to accommodate specific individuals or groups of individuals.[467]
    - While UD is often referenced in efforts to design products and environments that are inclusive of people living with disabilities, in line with its definition, the approach does not promote modifications for individual needs but rather celebrates the inherent diversity of humans and advances design that, by default, could universally accommodate use by and benefit all.[468]

KEY HEALTH AND WELL-BEING EFFECTS

- Modern advances in medicine and technology have made accidents and injuries that once may have been fatal now treatable and have helped to expand average human life expectancy, making older adults and individuals of varying abilities more proportionally prominent members of our communities.[469]
- Demographic changes around the world in both developed and developing countries, including declining fertility rates, have resulted in an aging population.[470,471] Estimates from the United Nations predict that by 2050, worldwide, one in six people will be over the age of 65 (one in four in Europe and North America).[472] The year 2018 marked the first year in history where adults over 65 years of age outnumbered children under five years of age.[472] These new trends will have profound impacts on housing, transportation and needed goods and services, among other societal dimensions, and healthy aging will require support for physical and cognitive functioning and for social participation and inclusion.[473-475]
    - Aging involves the accumulation of damage to cells that can weaken the immune system and increase a person's risk of disease.[476] While these effects will invariably happen to everyone, there is considerable variance in an individual's health trajectory, wherein some individuals experience sudden and rapid declines in health, while others can maintain good health without need of much support or medical intervention.[472,476-478]
- Individuals living with disabilities account for approximately 15% of the world's population, and often experience poorer health outcomes and discrimination.[479] Further adverse effects can be experienced by these individuals as a function of environments or products poorly suited to their use.[480] For example, children living with disabilities are often prone to lower academic performance, higher dropout rates and poorer outcomes post-graduation, including lower participation or achievement in postsecondary education and difficulties securing meaningful employment.[481] Studies indicate that features of the built environment, such as household design, can become barriers for older adults, especially those with functional/physical limitations, as environments are not typically designed to accommodate these needs.[482]
- Neurodiverse individuals – or those with variation in the brain related to learning, attention, mood, sociability and other mental functions, including those with autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD) or dyslexia -- are an integral component of the workforce.[483] It is critical to consider how workspaces can be designed to support the diverse learning needs of these individuals.[483]
    - Employers have reported that taking steps to recruit and retain neurodiverse employees has improved their bottom line and that implementing inclusive design accommodations through the principles of universal design resulted in workplace environment improvements for all employees.[483]
    - Effective accommodation practices to support inclusiveness for neurodiverse individuals can include tailored trainings and strategies for stress management, time management, company structure and organization.[483]

- Neurodiverse individuals have varying levels of learning ability, including differences in how they process auditory events, memories, event sequencing, and language, alongside different abilities in gross and fine motor function.[484]
  - To support diverse learners, organizations can utilize strategies such as providing notes and recordings of meetings or trainings, creating daily task sheets, and allowing for flexible work scheduling to accommodate appointments.[484]
- UD can also serve employees who have experienced discrimination or stigma, such as members of the LGBTQ+ community, by supporting diverse backgrounds, cultures and identities through strategies such as safe zones and ally groups.[485]

HEALTH PROMOTION BENEFITS AND STRATEGIES
- Accessibility codes and standards represent a foundational step in giving individuals of diverse abilities an opportunity for equal, discrimination-free participation in society.[466]
- However, such codes and standards often provide only minimal or limited guidance on specific strategies to accommodate people of varying abilities, and typically only basic accessibility is established, neglecting further consideration of more comprehensive accessibility and actual usability.[468]
  - While these regulations establish minimum criteria, they can often be treated in the building industry as maximum criteria, defining the exact level of accessible design up to which spaces are made compliant.[466]
- UD expands beyond basic accessibility to emphasize inclusion and equality, and can thus represent a way to improve well-being and quality of life for individuals who may otherwise be restricted in their abilities to fully participate in certain activities.[486]
- Seven principles of UD guide the approach:
  - (1) Equitable use: Make design of spaces and features appealing and identical to all users and provide an equivalent if identical is not possible (e.g., different heights of drinking fountains available to accommodate children or individuals in wheelchairs).[468,469]
  - (2) Flexibility in use: Provide choices in methods of use; contribute to adaptability (e.g., larger buttons on an office desk phone to accommodate varying visual abilities).[468,469]
  - (3) Simple and intuitive use: Eliminate unnecessary complexity, be consistent with expectations and accommodate a wide range of literacy and language skills (e.g., icons adjacent to buttons on devices to accommodate diverse linguistic understanding and cognitive abilities).[468,469]
  - (4) Perceptible information: Use a variety of modes for information delivery (pictures, verbal, tactile) and maximize legibility of pertinent information (e.g., dark backgrounds with lit-up signs for directional information to facilitate easy wayfinding for wide-ranging mobility, cognitive and visual abilities).[468,469]
  - (5) Tolerance for error: Arrange objects and elements in a manner to minimize error; provide warnings of errors and fail-safe design (e.g., warning labels on chemicals).[468,469]
  - (6) Low physical effort: Ensure work tasks are conducted in a neutral body position; design to minimize repetitive or sustained physical efforts (e.g., ergonomic workspaces to support physical comfort for all, resting spots to break up prolonged walking spaces and accommodate diverse physical abilities).[468,469]
  - (7) Size and space for approach and use: Provide a clear line of sight for important elements from both seated and standing heights, and adequate space for assistive devices (e.g., wide points of entry/exit for ease of access by individuals with diverse mobility needs or those using a wheelchair or walker).[468,469]
- Educational application of UD (Universal Design for Learning, or UDL) is supported by a large body of literature that demonstrates UDL is an effective strategy to make learning processes accessible to students of diverse sensory, motor, linguistic, cognitive and affective abilities in intuitive and inclusive ways.[468,487-489]
  - UDL often focuses on technology-based strategies (e.g., use of virtual textbooks, keyboards that accommodate varying fine motor skills), but there are also low-tech or curriculum- and instruction-focused strategies that are equally important (e.g., accommodating right- and left-handedness, using a variety of modes — visual, verbal, tactile — in presenting information to provide choices in learning and accommodating different language and literacy skills).[468,487,488]

FEATURE C14: EMERGENCY PREPAREDNESS

OVERVIEW
Part 1: Develop an emergency management and response plan outlining specific steps to take in various types of emergencies and conduct annual occupant emergency drills.
Part 2: Have in place specific resources to support emergency preparedness and response, as well as emergency training and personnel.
Part 3: Provide opioid response kits and protocol, in addition to opioid emergency response trainings.

SCIENTIFIC BACKGROUND
- A disaster is any event that exposes a significant number of people to a hazard or threat, resulting in injuries and/or death.[77] Disasters disrupt normal processes and overwhelm the affected community's capacity to respond.[78,79]
- An emergency refers to an event that can be handled with existing resources and capacities, but requires individuals and communities to take extraordinary measures to prevent further harm or damage to people or the environment.[77-79]
- Both natural- and human-caused emergencies and disasters can occur anywhere in the world, affect any person and impact the health and well-being of both persons directly affected and also the community at large.[77,80]
- Planning helps communities adequately respond to active emergencies and prevents future emergency or disaster events from escalating into extreme situations by identifying ways to potentially mitigate and control the reach and magnitude of experienced losses.[77]
- Opiates are naturally occurring chemicals, such as morphine and codeine, that are found in the opium poppy plant. Opioids include opiates as well as human-made, chemically manufactured products that are derived from opium and are either wholly or semi-synthetic, such as fentanyl, oxycodone and hydrocodone.[490]
  - Opioids are used for a number of therapeutic purposes, chiefly for pain relief, and are often prescribed post-surgery for people who suffer from chronic pain and to provide relief for people with cancer.[491]
  - Opioids bind to receptors in a part of the brain associated with pain and emotions, reducing pain and promoting feelings of euphoria and calmness.[490] Opioids also act on a part of the brain that controls breathing and in high doses can cause respiratory depression, permanent brain damage or death.[492] Their highly addictive composition and uptick of use in recent years have led to the opioid epidemic in the United States.[490]

KEY HEALTH AND WELL-BEING EFFECTS
- Types of emergencies and disasters range from natural disasters, toxic exposures and acts of violence to communicable and non-communicable disease events.
- The frequency of natural disasters has increased in modern times. In 1960 there were 40 natural disasters globally – the highest recorded number since the beginning of the 20th century.[81] In the 21st century, the lowest recorded year saw 276 natural disaster events, while the highest year saw 432 natural disaster events.[81] In 2018 alone, 281 natural disasters caused nearly 11,000 deaths and further affected 61.7 million people worldwide.[82] Global death rates due to natural disasters have decreased during this time due to prediction technology, resilient infrastructure and emergency preparedness and response. But this increase in annual disasters highlights the need for institutions and communities to be prepared to quickly and efficiently respond to natural disasters when they occur.[81]
- The International Association of Fire and Rescue Services reports that there were 777,794 structure fires in 2016, more than half of which (475,500) were in the United States, followed by Russia (107,205) and France (86,407).[83]
  - The above reflects data from 20 countries around the world, suggesting that if more countries collected this data and/or participated in reporting, the total number of annual structure fires would be much higher.
- The health consequences of chemical incidents (e.g., accidental exposure to chemicals typically related to industrial practices) vary depending on a number of factors, such as the nature of the chemicals in question, the duration of exposure, the dose and so on. Chemical incidents can cause everything from skin or eye irritation to depression of the central nervous system and mental health issues.[84,85] These effects can be acute or chronic, and exposure could trigger the onset of other common diseases that vary in severity down the line, such as cancers and asthma.[86-90]
- Data available from 171 countries around the world showed an average of 1.7 mass shooters per country from 1966 – 2012.[91] Mass shooting events occur in many countries, but 31% occurred in the United States during this span of

years. This data also shows that the US had by far the greatest number of mass shooters, with 90 offenders, followed by the Philippines, Russia, Yemen and France.[91]

- There are dozens of disease outbreaks (e.g., Diphtheria, Ebola, COVID-19) occurring globally at any given time, and in an increasingly connected world, a disease from an isolated, rural village can move to a major city within 36 hours.[92-94]

- COVID-19, a respiratory disease that is caused by the novel coronavirus SARS-CoV-2, was first documented in 2019 and spread globally, becoming a pandemic in 2020.[93] In May 2020, 188 countries had confirmed cases of COVID-19, with each person infected spreading it to, on average, 2-3 other individuals.[95,96]
  - o The impact of COVID-19 across countries and regions has varied widely, dependent on preparedness and response measures. Where early action was taken to rapidly test and isolate positive cases, implement comprehensive contact tracing, and quarantine contacts for those who tested positive, regions were able to slow the spread, bring outbreaks under control and minimize secondary mortality.[97]
  - o In regions that have seen exponential growth in transmission, new emergency response measures have been put in place to enforce physical distancing and movement restrictions to slow the spread. However, such isolating measures have contributed to severe economic downturn and deep mental health repercussions; disadvantaged groups who are unable to physically distance or seek health services have been disproportionately impacted.[97]

- Cardiovascular disease (CVD) is the leading cause of global mortality and out-of-hospital cardiac arrest is the leading cause of death.[493,494] 60% of all CVD deaths are attributable to sudden cardiac death (individuals who have no prior history of heart disease and do not meet high-risk diagnostic criteria) with approximately 4-5 million cases per year.[495,496] Close to 70% of sudden cardiac arrests may be observed by a witness, meaning that life-saving intervention could be possible.[497]

- The latest available data indicates that there were approximately 27 million people around the world who suffered from an opioid use disorder in 2016.[492] In 2017, 66% of 167,000 global deaths from drug use disorders were due to opioid use.[498]

- In the United States alone, drug overdose deaths more than tripled between 1999-2018, and in 2018, 69.5% of all drug overdose deaths were due to opioid use.[499]
  - o Opioid misuse overall is higher in the United States and Canada compared to other parts of the world.[500,501] However, evidence shows an increase in prescription opioids in parts of Europe as well.[502-505] In 2017, among those aged 15-64-years-old, there were an estimated 8,799 annual deaths caused by overdoses.[506]
  - o Overdose is also a major cause of death in Asia and Australia and it is suspected that opioid use is increasing in African regions as well.[507-510]
  - o The increase in the misuse of opioids and overdose deaths is widely attributed to the increase in prescription opioids by healthcare professionals, fueled by aggressive tactics from the pharmaceutical industry that exaggerate the benefits of opioids while under-emphasizing the risks.[511-521]

- As the world has woken up to the devastating effects of the opioid epidemic, most recent data from the United States is encouraging, stating that drug overdose deaths decreased by 4.1% from 2017 to 2018.[499]

HEALTH PROMOTION BENEFITS AND STRATEGIES

- Disaster events are unpredictable, sometimes inevitable, and can happen at any time, in any place.[98] In most disaster events, victims are affected instantly. Chemicals or biological toxins can exert health effects immediately upon exposure; each minute that passes after cardiac arrest without intervention decreases the chance of survival by 10%; and most active shooter events last less than 15 minutes.[99-101] All of this means a rapid, efficient response is necessary in times of crisis, and that there is a strong need to consider and plan a response protocol.
  - o During a terrorist attack at the World Trade Center in 1993, it took an investment banking company four hours to evacuate employees from the building, requiring some to walk down more than 60 flights of stairs. This prompted the company's reevaluation of emergency response plans and it ran drills to practice new procedures. When the Sept. 11, 2001 terrorist attack on the World Trade Center occurred, the company was able to evacuate 3,800 employees within 45 minutes.[102]

- The World Health Organization (WHO), Federal Emergency Management Administration, American Red Cross and other leading emergency response groups recommend that alongside proper planning, practicing emergency drills, and having a clear communication plan in place to convey emergency response protocols at the time of an emergency, is critical to help organizations appropriately and efficiently execute their emergency response plan.[103]

- Especially with disease outbreak management, planning is necessary for effective communication, but the WHO maintains that this holds true for other emergency situations as well.[98] The WHO indicates that effective response strategies include early and transparent announcements covering the situation and leadership consensus on any limits on transparency and other communication protocols before a crisis occurs.[98]
- Training individuals to respond to emergency events can be an effective strategy to minimize losses suffered, since bystanders are on the scene before professional response teams arrive. In the case of sudden cardiac arrest, studies show that laypeople can be effectively trained to perform cardiopulmonary resuscitation (CPR) and use automated external defibrillation devices (AEDs) in an effort to improve survival rates.[522,523] A person who is defibrillated within 10 minutes of a cardiac arrest can have a 40% chance of survival without serious adverse neurological effects, compared to a 5% chance of survival for people who receive defibrillation 10 minutes or longer after a cardiac arrest.[100,524,525]
  - Studies show that even untrained laypersons can operate an AED, speaking to the utility of increasing the availability of AEDs in case of emergency.[526,527]
  - While the number of out-of-hospital cardiac arrests is difficult to measure accurately, it is estimated that up to around 70-80% of sudden cardiac arrest events occur in residential settings.[495,497,528,529]
- The WHO strongly recommends that people who are likely to witness an opioid overdose should have access to naloxone and be trained in how to use it in an emergency.[490]
- Since opioid overdoses are usually witnessed by a close friend, partner or family member, ensuring that naloxone is available means these individuals can act fast in case of an emergency.[530-534] This is particularly important in residential spaces, given that opioid overdoses occur most often in private homes.[535] Overall, bystander intervention has been shown to reverse between 75-100% of witnessed cases.[536-541]

ADDITIONAL NOTES
- Compared to people living in high-income countries, people living in low-income countries are seven times more likely to die and six times more likely to be injured, displaced or require emergency assistance when a natural disaster strikes.[104]
- Natural disasters force an estimated 26 million people around the world every year into poverty.[105]
- While reversing the effects of opioid overdose can save lives and prevent premature deaths through the use of naloxone, the most effective strategy for reducing the burden of disease associated with opioid use is prevention. Studies suggest that medication-assisted treatment that uses drugs such as methadone and buprenorphine can significantly help to prevent overdoses from occurring in the first place, and kick-start rehabilitation from substance use.[542-545]
- Research also suggests that both in the case of natural disasters and cardiac events, people are differentially affected depending on factors such as socioeconomic status, race and gender.[106-112]

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