

Review

Trust in and Building of Sustainable Local Health and Well-Being Programs in the United States

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Abstract: The U.S. healthcare system is by far the most expensive per capita in the world and does not deliver the best outcomes. The literature shows that the U.S. population is distressed about what it is paying for and is especially distressed about people and companies that it perceives as sacrificing the public good for personal profit. Nevertheless, studies show high levels of trust in nurses, pharmacists, personal physicians, fire and security officers, engineers, and other practitioners who provide services at the local scale. Artificial intelligence (AI) poses an opportunity to reduce healthcare costs, yet it concerns the public because its misuse may violate personal boundaries, spread inaccurate data, and lead to other undesirable outcomes. The literature illustrates the benefits of cooperative relationships between community groups, local governments, and experts using new AI tools in support of local public health and well-being programs. One important example is preventing and reducing the consequences of acute hazard events. Overall, this review makes a case that focusing on the community scale represents an opportunity to improve health and well-being outcomes by establishing trusted and sustainable relationships.

Keywords: artificial intelligence; competence; communications; healthcare; trust; values



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1. Introduction

Trust is believing that practitioners and their organizations can be relied upon to improve human health and well-being because they are competent and communicate information that is accurate, timely, and in comprehensible formats. Trust also means demonstrating values that are consistent with public expectations, such as compassion, honesty, respectfulness, and transparency. Trust has become a challenge for healthcare services, including well-meaning practitioners and organizations in the United States, because of its incredibly costly and complicated system and periodic failures. Rather than dwell on the near-impossible effort to redirect the massive corporate and federal U.S. healthcare system, we focus this review on two positive directions that we believe may increase public trust and contribute to better health and improved well-being, especially at the local scale where trust is higher than at the state and national ones:

- (1) Increasing the role of public and private organizations in community needs, including rethinking master plans, including zoning, planning for recreation, Americans with Disabilities Act (ADA) compliance in public buildings and on sidewalks, open space, multiple uses for buildings that are not used all the time, disaster prevention and response, and more;
- (2) Using artificial intelligence (AI) to supplement the gap between community needs and limited local resources.

This review is divided into six parts. The first defines trust and examines what we know about public trust in practitioners and organizations in the United States. Part two examines trust in the much-maligned U.S. healthcare system. Part three considers what local governments, private and not-for-profit organizations, and informal community

groups can do at local scales to improve health and well-being, and to build sustainable trust in communities. Section four is a case study focusing on disaster response, which is a critical test of all the trust elements needed under extreme pressure to protect human health and well-being. The fifth section examines roles for a combination of communities and experts using artificial intelligence to enhance local efforts. The final section discusses the policy implications of our assertions and priority research needs. While our focus is on the literature, examples of practice by the authors are used to highlight the importance of trust.

2. Trust as a Cornerstone

Researchers have used population studies and experimental designs to divide trust into different parts, three of which appear to be observable in nearly all of them: (1) competence; (2) communications; and (3) values [1–9]. The public should be able to trust that those providing health information and healthcare services are competent, that is, they are well trained, knowledgeable about recent developments in their fields, and can apply that knowledge to the individual and larger community. For example, someone responsible for reducing automobile-related injuries and deaths in a city should know the different ways to institute traffic calming and can gather data that will indicate where road narrowing, lane reductions, on-street parking, crosswalks, speed humps, and other options are appropriate.

Technical competence is necessary but not sufficient. Traffic safety experts need to listen to people who live and/or work near problem locations, as well as to those who drive through dangerous ones. Suppose a local road is going to include changes that improve traffic flow and reduce the likelihood of accidents. Neighbors near the site need to be notified in multiple ways (e.g., local newspapers, street postings, the web, and public meetings). Sometimes, the public needs to be notified multiple times and through different sources. Failure to communicate in acceptable ways and at appropriate intervals inevitably causes opposition from people who conclude that the experts are arrogant, cavalier, conceited, and snooty, among other expressions of distrust [10,11].

Values are a critical component of trust [12,13]. A good technical solution may be perceived as unacceptable by community members who dislike it because it violates their values. For instance, the first author served on a National Academy Panel that oversaw the destruction of the U.S. military's entire stockpile of chemical weapons. When the panel visited the eight chemical weapons locations in the United States, they were generally welcomed by community members who viewed them as scientific experts. But not always. The problem was mistrust. For example, in one community, over 200 people packed into a meeting hall. The local community representatives shouted at the expert panel for favoring incineration as the solution for disposal. Their angry spokespersons were convinced that an incinerator symbolized government disrespect for the community, the majority of whom were African American. The local population's image was built from experiences with a major chemical company that had caused serious environmental contamination. Their representatives asserted that the incinerator was going to be built regardless of community concerns and the Army would use it to burn other "trash." This ugly incident could have been avoided by earlier, more direct, and regular contact between the military and the community. Such communication could have more effectively disconnected the Army from the chemical company in the community's eyes. Another important step would have been to describe that the incinerator and accompanying structures were designed solely to burn liquid drained from rockets, bombs, and other types of military ordinance, and stipulate that the incinerator would not be reused for other purposes.

This venting session helped diffuse the animus at the meeting. However, the relationship between the U.S. military and members of the local community remained hostile, including the filing of an environmental justice lawsuit by the community to stop the incineration. The lawsuit failed, the incinerator was built, and the weapons were destroyed, but the Army learned a lesson. When other sites later proposed non-incineration alternatives for chemical weapons disposal, the Army was open to their thoughts. Two of the nine

chemical weapon sites ultimately adopted non-incineration technologies [14]. To conclude this example, the use of standard incineration would have led to more rapid destruction of the weapons and perhaps less public risk at the two non-incineration sites. However, the fact that the Army went forward with non-incineration alternatives suggested by two of the communities illustrates the importance of what Earle [3] calls “relational” trust. By early 2023, all the chemical weapons were destroyed at all the sites.

Looking back at this case with two decades of hindsight, the reality is that both the proponents and opponents of incineration were right. The committee and Army’s support for large incinerators was the correct choice for sites that stored the vast majority of the weapons, requiring large-scale technologies to meet U.S. treaty obligations. The few sites that did not use large incinerators had much smaller stockpiles and had more time to test options before selecting one. As one of the participants, the first author believes that both sides of the debate were unwilling to listen to each other’s arguments when these options were initially set forth. It was only after the Army decided to allow the development and testing of options that the parties evaluated options for the smaller sites.

Trust may change [15]. For instance, Poortinga and Pidgeon [6] found that people start with a view and tend to select evidence that is consistent with their beliefs. Those without a strong position are more apt to change their view, especially in response to bad news, which is enhanced by the media’s focus on negative events. That is, good news is not news, and bad news increases negative perceptions and increases distrust. A recent powerful example is COVID-19 trust-related issues in the United States. Multiple COVID-19 surveys were conducted. For example, Agley [16] examined 61 surveys that examined the impact of the epidemic on public trust in science. We highlight one survey of over 800 U.S. residents conducted by Latkin et al. [17] in March (when the first known U.S. cases were reported) and repeated in July. The authors compared the trust in the White House, the U.S. Centers for Disease Control and Prevention (CDC), state agencies, the mainstream media, and Johns Hopkins University (used to exemplify prestigious university science). Consistent with expectations, Latkin et al. found that in March, the university and CDC (both 81%) and state government (76%) were trusted more than the media (41%) and the White House (31%). Four months later, trust in all of these institutions declined, with the most precipitous declines in the CDC and White House. Further analysis suggested that as the pandemic spread, people fell back to the positions of their chosen political parties, thereby relying on politically filtered science rather than on assertions by individuals not identified as politically affiliated.

Trust-related problems have also been observed for climate change, offshore gas and oil drilling, mining, electromagnetic fields, the genetic modification of organisms, urban development, the Ebola virus, and other risk-related threats [18–26]. In 2000, Uslaner [27] (p. 569) appropriately described trust as the “chicken soup of social life”. With it, we feel better; without it, we may not.

3. Overcoming the Healthcare System Cost Burden and Declining Trust

The U.S. healthcare system has become a proverbial sore thumb for anyone trying to build trust in health and well-being programs because of the system’s high costs and claims of profiteering at public expense. The Organisation for Economic Co-operation and Development (OECD) used 2022 data and compared expenditures on health care to gross domestic product (GDP). The U.S. ratio was 16.6 percent compared to 12.7 percent for Germany and 12.1 percent for France. The average for the full set of 38 OECD nations was 9.2 percent for that year. The argument that U.S. health outcomes are better is not supported by the data, and in some cases, the outcomes are worse [28]. For example, the U.S. life expectancy at birth in the year 2021 was 76.4 years compared to the OECD’s 80.3 years, where 1 is the best and 38 the worst, the U.S. ranked 31 of the 38 nations. It ranked 35 in adult diabetes, 36 in obesity, and 36 in eligibility for health care. Overall, as U.S. costs are much higher and outcomes are not better, the nation faces a fundamental challenge in maintaining public trust in its healthcare management system.

Americans are well aware of the realities of the extraordinarily high cost of health care, lack of universal coverage, and mediocre if not worse outcomes compared to those of other urban-industrial nations. Data show that the U.S. population is not older or sicker. What stands out is the greater use of high-cost technology and the overall use of medical care. In 2012 and 2018, Gallup [29] asked a sample of U.S. residents to compare their healthcare systems to those of other modern industrialized countries. Twenty-eight percent said that the U.S. system was the best or above average compared to others. Forty-three percent said it was the worst or below average, a shocking outcome for a country that expects to have the best or nearly the best of these programs.

A note is in order here about the surveys we used. While our interest focuses on the present, this objective requires measuring changes in trust in the U.S. healthcare system over time. Only a few organizations—Gallup, Harris, and the National Opinion Research Center (NORC)—have been accumulating poll data for decades, especially about the healthcare system. Gallup's national data samples are the most consistent regarding questions, timing, and sampling protocol. We used them for consistency. Some of Gallup's questions about the U.S. healthcare system go back to 1980. In 2022, the organization reported that 68 percent of U.S. respondents picked "crisis" or "major problems" to characterize the U.S. healthcare system, which was a slight improvement compared to the responses in 2020 and 2021 (the COVID-19 period). Twenty-seven percent of respondents noted that they put off what they described as treatment for a "serious medical" condition because of cost [29,30]. The high cost of U.S. health services and the belief that unfairly high profits are being earned by parts of the healthcare system are a huge burden on public trust.

Declining trust casts a painful shadow over nearly all institutions and professions in the United States and in many other countries. Blendon and Benson [31] examined more than 40 years of public opinion polling about trust in the United States, noting that only the U.S. military appears to have maintained a high level of public trust. Public schools, universities, banks, hospitals, and almost every institution are considered less trustworthy than they were two generations ago. Increasing distrust is intertwined with political polarization in the United States, with those who support the Republican Party demonstrating much less trust than those who claim to support Democrats. At the bottom of the trustworthy list in U.S. polls are members of the U.S. Congress and used car sales employees (<10% perceived as trustworthy). The public distrusts those who make and implement policies, especially any that appear to substantially profit from those policies, such as pharmaceutical and insurance companies. In contrast, key health professionals (nurses, pharmacists, physicians) remain at the top of the trusted list, along with schoolteachers and engineers. While it is true that the COVID-19 pandemic reduced trust, it is also true that these negative trends have been building for four or more decades [32].

Proximity is another factor impacting trust. People and institutions that interact directly with the public have higher levels of trust than those who have no personal contact. In other words, the federal government is trusted less than state governments, which, in turn, are trusted less than local governments. A local branch of a company or not-for-profit is more likely to be trusted than a regional or an international one. For example, a 2022 Gallup poll [29] determined that about two-thirds of respondents say they are "confident" in the accuracy and advice of their physicians. When asked to rate medical personnel, almost 90 percent said their nurses and doctors were excellent or good. In strong contrast, 55–65 percent said that health insurance companies were impersonal, and they rated them as fair or poor. Before the passage of the Affordable Care Act (ACA), only 38 percent of U.S. respondents believed that it would accomplish President Obama's goals of providing care for more people and reducing costs. These and other responses to poll questions show that the public does not trust elected officials to pass comprehensive healthcare legislation that will meet those goals. This declining trust in elected officials and their managing departments has held since President Lyndon Johnson signed the Medicare and Medicaid Act of 1965. This supports Brady and Kent's [33] conclusion that the United States has seen 50 years of declining trust in its major institutions.

The local scale represents an opportunity for increasing trust. For example, Gallup [34] asked how trust and confidence vary depending upon the level of government. Sixty-eight percent of respondents had a great deal or a fair amount of confidence that their local government could handle local problems. This compares to the results for state government at 59 percent. The federal branch numbers for handling local problems were notably lower: judicial at 49 percent, and executive at 41 percent. When asked about the federal government's ability to handle international problems and domestic problems, the results were 44 percent and 37 percent, respectively, with the federal legislative branch at only 32 percent. All these numbers were higher in the 1970s, although the declines for local and state governments were less.

O'Leary, Welle, and Agarwal [35] report on a sample of over 6000 Americans in a study that digs deeply into levels of government trust, and produced an interesting observation. The authors note that "trust in governments has been battered" (np). Notably, they find that a citizen's digital experience with a government agency is strongly associated with trust. Respondents who had positive experiences with their state digital services were more trusting of those agencies, which means that the digital systems were easy to use, the people were able to accomplish their goals, and they felt their data were safeguarded. Respondents indicated that the agencies providing childcare services, housing, and food assistance, all of which provide services to low-income populations, were well intentioned. In contrast, those that provide unemployment benefits and motor vehicle licenses received markedly lower ratings and were characterized as having long delays and backlogs, as well as using outdated computer systems. The authors conclude that agencies need to focus on their digital experience, emphasizing humanity, reliability, and transparency, to build public trust. Butcher and Hussain [36] make the case for the growing importance of digital systems in U.S. health care and the need to address trust-related issues.

In summary, this section shows that the American public is distressed about what it judges to be selfish organizations and people placing profit above public interest, distancing themselves from people, and offering services on inefficient digital platforms. People who provide local services and do not appear to be exorbitantly profiting from those efforts are more likely to be trusted and can further enhance that trust by designing and implementing efficient digital systems. Local health officers, pharmacies, nurses, and physicians who interact with people, along with city planners, engineers, emergency responders, and others, have the opportunity to maintain high levels of trust and contribute to community well-being.

4. Taking Advantage of Higher Local and Personalized Trust to Build Local Well-Being

This section considers steps that can be taken to improve health outcomes and well-being at the local level. It begins with creating trust by listening to the community. One example is the second author's experience of serving for decades on a local environmental commission. The community's main concern was not water quality, air pollution, or siting a new reclamation facility. It focused on a deer-car collision that caused the death of a local teenage driver. Community outrage was split. Some focused on deer over-population and the hazards the deer pose to not only drivers, but to crop and garden damage, and as hosts to the ticks that carry Lyme disease. They wanted the deer killed immediately. Other residents cried out that the problem was that human development had overtaken most of the local deer habitat, that living with wildlife is a powerful environmental experience, and that hunting was not only inhumane but dangerous in a suburban community. Residents did not want sport hunters wandering about the community and feared for the safety of their children and pets.

Experts were brought in for a series of public meetings to explain that trapping and re-location were expensive and that most of the deer did not survive the process. Other public meetings focused on experts who explained that palliative measures were not effective and that the best answer for both the health of the deer and the safety of the local population was to cull the herd. Yet, the community did not trust the experts, believing they were simply

pushing hunting. Instead, they demanded non-hunting alternatives. In response, the town paid for increased fencing, road reflectors, and signs at deer crossings, and contracted with a local university to be the first site for an attempt at deer contraception [37]. All those attempts failed, and it took several years of continuing public meetings that listened to the community's concerns before the town council finally voted to hire a professional deer management service that would use a net-and-bolt system rather than hunting to cull the herd. Despite continued resistance from what had become a far smaller group [38], the community as a whole began to trust the town council's decision (perhaps helped by the fact that there was no audible gunfire in the net and bolt process). Hiring this service is now carried out annually and it appears as a line item in the town's budget. The result has been reduced property damage, far fewer deer-car collisions, improved public trust in local government, and a smaller, healthier deer herd. Arguably, the community became inured to the issue and chose to move on to other concerns. However, this community is among the most educated and affluent in the United States and has a record of making challenging political decisions based on communications and building trust that others would not, for example, merging the borough and the surrounding township into a single municipality.

Those with the responsibility to build and sustain community health and well-being are disproportionately involved directly or indirectly in personal health and well-being professions. The November 2022 Gallup survey [39] asked 1020 Americans to rate 18 professions regarding being honest and ethical. The five professions at the top of this list that were considered very highly or highly trusted were nurses (79%), medical doctors (62%), pharmacists (58%), high school teachers (53%), and police officers (50%). Three of these five are members of the health professions and the other two have major opportunities to improve health and well-being as part of their jobs. In contrast, telemarketers, members of the U.S. Congress, car salespeople, and advertising and business executives each had ratings of 15 percent or less in terms of being ethical and honest.

Nonprofit organizations are major players in providing resources for community health and well-being. Herzlinger [40] recognized the vulnerability of nonprofits to the challenges of dishonesty over two decades ago. She noted that nonprofits are normally very good, but they can also be "horrid". Nonprofit and some government work is often shrouded by secrecy, which is only exposed when these agents behave unethically, thereby violating public expectations. Berman [41] raised the same issue 25 years later. Eisenstein [42] discusses several of these cases. Guilt by association is all too common in public perceptions of organizations and professions.

The flip side of citizen trust in health professionals is the professionals' trust in their clients and the healthcare system. Without mutual trust, cooperation is limited. Astrom [43] surveyed 1430 Swedish local government managers of health, planning, engineering, security, and other departments. About four in five respondents assessed their clients as reliable and sincere in their contacts with their local government. About half felt the citizens were well aware of local government issues. Yet, less than one in five believed that the citizens were committed to improving the municipality and were not aware of local issues, which, if commonly true, are serious problems in building community-expert partnerships.

Considerable effort has been made to measure not only public trust in physicians but also physician trust in their patients and the healthcare system. For example, the ABIM Foundation [44] surveyed 600 physicians and over 2000 members of the public. Respondents' trust perceptions were similar. About 90 percent of physicians trusted other physicians and nurses who deliver care compared to lower values (66–80%) for healthcare organizations, hospitals, and healthcare organization leaders. The public respondent numbers for the same questions were 85 percent for doctors and nurses, 64 and 72 percent for the healthcare system, and 72 percent for hospitals. Notably, public trust in health insurance companies was 19 percent among physicians compared to 33 percent among public respondents. Also interesting is that physicians trusted some community health services that support their patients: meal services (76%), social services (70%), religious

institutions (67%), and transportation services (61%). In other words, the closer the personal working relationships, the greater the trust.

The same survey explored trust between physicians and their patients. Ninety percent of the general public said their physicians were honest with them, and 83 percent said their doctors trust what they say. Ninety-eight percent of physicians indicated that their patients trust them, 96 percent said their patients treated them with respect, and 90 percent of physicians said their patients were honest with them. The relatively few patients who did not trust their physicians said that their physicians spent too little time with them (25%), did not know them (14%), and did not listen to them (14%). Physicians offered poor communications (27%), high costs (14%), and challenges with insurance coverage (13%) as the biggest contributors to patient distrust. In other words, communication and cost are central to health-related trust issues.

5. Disaster Management at the Local Scale: Underscoring the Role of Trust

This section focuses on the opportunity to build and sustain local levels of trust in response to an emergency, such as an oncoming hurricane, a sudden tornado, a rail accident, an explosion at a factory, or another health hazard emergency. Working before, during, and after an emergent event is required to reduce deaths, injuries, and damage, and reduce the chance of the initiating event triggering others. The first requirement is a hazard mitigation plan (HMP), which is required of every U.S. state and territory that wants to receive federal funds after a disaster event [45,46]. Major cities and many counties also have HMPs. They should include land use plans, zoning, and other steps that reduce the number of people at risk. They should also include training for first responders who will know what to do as the event unfolds, as well as coordination with local hospitals, shelters, and other groups that transport and care for at-risk people. Communication capabilities are often diminished during events, and hence, pre-event planning should include physical facilities and human practices that can maintain communications between medical facilities, police, and fire departments.

When covering potentially devastating events, the media is typically drawn to the devastation itself, to the rescue of stranded people, or to the stories of those mourning the destruction of their homes or the loss of loved ones. However, local planners and first responders focus on the charts that link all responsible parties who will be relied upon before, during, and after an event. Getting the fire, police, health, social service, water, sewer, urban planning, engineering, and all the other local government departments, for profits and nonprofits, as well as selected citizens, to agree to strategies and investments to address the event is a task that requires trust in the local political officials and processes. Hendrickson et al. [47], Kumar et al. [48], Salim et al. [25], and Beshi and Kaur [49] argue that a good response to a hazard event depends on public trust in local officials. Jameel et al. [50] list criteria for trust in good governance, including accountability, culture of law, democracy, equality, fairness, integrity, responsiveness, and transparency. These criteria are especially challenging to meet in poor and underserved communities where trust in local governance may be absent [51,52].

Some places have impressive hazard mitigation plans and practices. For example, Chen and Greenberg [46] examined nine U.S. cities that are considered highly vulnerable to natural hazards to determine the extent to which destructive cascading hazards were a focal point. Portland, Oregon; Los Angeles, California; and New York City's most recent hazard mitigation plans were identified as the best at addressing solutions to prevent cascading events. Several others mentioned specific locations at risk in their cities, but detail was limited. There was no way to determine the extent to which trust had been established between the local communities and the hazard mitigation planners by relying on the number of meetings and other indicators documented in the HMPs. FEMA assesses the quality of HMPs as part of its HMP approval process, which occurs every five years. Detailed reviews that include government and public groups are rare. Feinberg's [53] study of 33 county-scale HMPs in the State of Washington is an exception. The author

used surveys, county-scale census data, and planning information. He reports that joint decision-making processes between state agencies and counties, as well as joint efforts by counties to build trust, along with county economic capacity, were correlates of higher-quality outcomes. Notably, past disaster experience and the severity of previous disasters were not predictive. Feinberg notes that empirical evidence on this subject is limited.

For their review, the authors wanted to provide an example of a place with limited resources and that had a large proportion of vulnerable people rather than populous and well-funded cities. That place was the U.S. Virgin Islands.

The Virgin Islands were struck by hurricanes Irma and Maria in 2017, and they have had ongoing problems with lead and copper in their water supplies. Hendrickson et al. [47] examined the relationships between trust and community resilience by surveying the islands' community members. They found that trust was divided into competence-based and communications-related factors, along with a values component. For example, people who trusted their elected leadership also trusted their fellow community members and felt that the local government was prepared for emergencies. They were less trusting of local businesses and the healthcare system. Regarding the values component of trust, respondents indicated that their local health service staff provided good care, food, and shelter during and after the crisis. That is, the local health service providers cared about the community, and they were proud to serve their community. The single strongest correlation of values trust was with a "sense of belonging to my community" ($r = 0.833$), and the strongest for competence and communications was with the Virgin Island's government ($r = 0.813$). This was a small study with only 388 respondents, yet the results show that members of underserved and poor communities do establish trusting relationships with their local service providers.

Another example is a case study that included a country that had a small enough population that the national government (1) would play a major role in emergency responses and (2) have direct contact with the public. Slovenia is a nation of 2.1 million people located in Central Europe and is known for its mountains, ski resorts, and lakes. Slovenia is also at risk from volcanic activity and floods. Malesic [54] studied 1024 surveys gathered from across the country, reporting that under normal, non-emergency conditions, the public had relatively low trust in the country's leaders. Trust, however, increased during emergencies. Most notably, respondents identified first responders from fire, police, military, and humanitarian organizations as trustworthy and meriting praise. In other words, the stress of the events and the face-to-face contact with emergency personnel and organizations raised the level of trust in local practitioners. The increase in trust during this period also extended to some national leaders.

A final example shows the impact of disasters on young populations (18–25 years old). Mackay et al. [55] examined the impact of over 1000 disaster events on almost 90,000 residents spread across 36 African countries. A key finding was that young respondents' recollections of how they were treated during the disaster event carried over to their current trust levels—most often as mistrust of officials and institutions.

6. Artificial Intelligence, Trust, and Community Well-Being

AI represents machine operations that simulate human analyses. The literature typically divides these operations into three categories: retrieving information, processing the information, and summarizing the results (such as retrieving your medical record or test results from a provider through a patient portal). It can also be upgraded to answer questions within the range of its programming (such as when you wish to return an online purchase and the vendor's program asks whether you wish to receive a refund, a replacement, store credit, or another option). Generative AI uses algorithms to write reports, create music, produce images, and offer verbal comments. Cognitive AI tries to replicate human activities, including reasoning, problem-solving, and decision-making.

Table 1 illustrates the potential applications of AI to community human health and well-being. The entries are not meant to be complete. Indeed, a good deal of the information is

from Quora [56], a program created in 2009 for individuals to pose and answer questions. The platform also has an AI component (a chatbot) that processes natural language and implements machine learning to understand and respond to questions. We read over 500 entries in Quora in response to a probe about sustainability and environmental protection. We grouped the responses into twelve categories. Note that Quora participants in AI-related surveys do not represent the U.S. population. Many self-identify as engineers, computer scientists, and environmental experts with positive views about AI and environmental protection. These data would be considered gray literature, which would also include blogs, annual reports, bulletins, speeches, press releases, interviews, and lectures. Hence, we view the table below as the cumulative views of proponents for AI and environmental health.

Despite the worthiness of the applications listed in Table 1, these applications require that communities trust AI experts and vice versa. The challenge is to build user trust around AI, which will not be easy. The AI trust literature is limited, especially regarding historical data. Surveys show that the public is equivocal about AI. A recent Pew survey [15] shows growing concern. Fifty-two percent of respondents were more concerned about AI than excited, compared to only 10 percent who were more excited than concerned. Concern increased relative to excitement by 15 percent. Adults ≥ 65 years old were the most concerned group (61%) compared to young adults (42%). The major concerns were about values, including a lack of protection of personal information, spreading false information, fraud, and profiteering (see also Fondrie-Teither and Jayanti [57]).

Forging connections between communities and experts in a politically polarized country like the United States is a major challenge. The idea of citizen science has been examined in the literature, with authors taking strong positions about the advantages and risks to communities and experts [58–67]. This idea stems from the late 1980s and includes participation from nonprofessional members of the public along with professional social and bench science scientists. Vohland et al.'s research [66] includes examples that should enhance trust and improve well-being. The first author was involved in several of these, identifying the best options for reusing contaminated sites. In these cases, the communities wanted to reuse contaminated sites for residential, educational, and dental facilities, but were concerned that the sites had not been adequately remediated. In one case, there was an underground pipeline of concern. The professional group worked with the community, including the municipal government, to assess the risk of different remediation and land use options and came to amiable understandings.

While studies filled with caveats and warnings about AI abound, we see a path leading to its success in some communities. This requires conceding ultimate choices to communities and begins with reaching agreements about what data to collect, where and when to collect them, and most importantly, what the goals of the data collection are. Community organizations tend to be interested in policy-related outcomes, whereas experts, often from local universities, also want to use data to meet policy-related goals but are drawn to creating new science, publishing, and winning external funding. As participants in these processes collectively for over 80 years, we found the sticking point is often the community wanting to collect data in places, at times, and in ways that they believe will further their objectives. So-called “confirmation bias” in community-based research undermines experts’ ability to make the results generalizable [64,66]. Facing confirmation bias, some experts withdraw from community interaction. A workaround compromise is for the outside experts to pull back from designing the project and fall back to the position of helping the communities locate and operate the tools to address their problems, including monitoring and interpreting their results.

Yet, even when experts defer to community goals, the proposal developed from jointly working together may not work. For example, the first author worked with a community group that wanted to remediate a former chemical plant and turn it into a school that would have facilities set aside for community meetings during the evening. The group worked with the larger community to turn the idea into a proposal. The proposal finished in second place, but it was rejected by the school board, which preferred a much more

conventional and inexpensive design. The community at large was upset, feeling that they had lost control over their environment. Their ire was aimed at the school board, however, not the team that brought design ideas and tools to the table to support the community.

Table 1. Community applications of artificial intelligence.

Category	Explanation
Diseases and injuries	• Develop monitoring processes and decision-informing tools that can be used by local health authorities for early detection of health-related trends that may otherwise be missed until serious consequences occur. • Develop software for people who have agreed to a system that will automatically alert them to important health-related services that are appropriate for them.
Empower communities	• Provide AI training, equipment and software to communities that will help them identify their priorities and address them. • Provide community groups with resources that will allow them to network with their community members and reach out to other groups that have similar issues.
Education	• Develop interactive tutorials for public use about health, environmental, social, and other issues identified as priorities by communities. • Develop tutorials for immigrants that provide background about the area and available services and meet other needs.
Environmental and social justice	• Monitor local environmental and social justice trends. • Help local government identify needs and priorities for affordable housing, food, and social services.
Transportation	• Monitor traffic hotspots, places where accidents occur, and use AI-created models to generate solutions for consideration by the community. • Investigate and suggest transit stops for consideration.
Energy use	• Help identify energy-efficient and affordable energy appliances, solar panels, maintenance, and other investments for individuals and small business. • Identify locations for energy investment for the local government and area.
Natural resources	• Examine local land use patterns for evidence of vulnerability to floods, wind, fire, ice storms and other climate change-related risks. • Use AI to monitor potable water use, status of storm water and sewage infrastructures, forests, biodiversity, and other local attributes to try to get ahead of problems.
Air quality	• Provide real-time data on air quality and noise, and assist in identifying the need for alert systems. • Simulate options for responding to chronic air quality issues.
Waste collection	• Identify alternative collection routes to reduce energy use, noise, and traffic congestion. • Devise options for increasing collection and selling of recyclable materials.
Police, fire, and public health services	• Use AI models to increase the predictability of security responses to fires, cyber events, illegal activities, and other threats. • Assist police, fire, and health officials in creating and implementing desktop exercises that will allow workers in key services to practice their responses.
Food and nutrition	• Help community and food service providers interact so that food is quickly collected and provided to needy populations. • Provide interactive tutorials that allow users to improve their understanding of how to purchase, grow, store, and manage food.
Urban planning and architecture	• Use AI models to orient, size, suggest materials, and otherwise develop designs, and estimate life cycles of planned structures and additions. • Predict local effects of climate events and generate plausible solutions for community consideration.

Similarly, the second author was funded by the state for more than two decades to work with the HIV community. The project, developed along the Centers for Disease

Control (CDC) and Substance Abuse and Mental Health Association (SAMHSA) guidelines, created a statewide group of experts, providers, and members of the HIV community that met monthly to find creative ways to reduce the epidemic. Policies were jointly developed and recommended to the state to fund effective local treatment and counseling agencies, attempt outreach to individuals at risk in shooting galleries, offer free HIV testing, and provide widespread education about safe sex practices. The group also recommended to the state legislature that they stop police from arresting individuals for simple drug possession and refer them for treatment, mandate Narcan in all police cars and schools, and provide access to free needle exchange. The state passed the first two recommendations quickly, but free needle exchange took several years to pass for political reasons. Overall, the epidemic declined across the state, and the linkages among those working on the issue created trust across boundaries that were previously acrimonious.

Overall, we believe that three conditions need to exist in a community for AI to play a constructive role in local problem-solving and build trust among the parties. First, the local communities need to debate and settle on a list of priority issues that capture the community's attention and will continue to be important to all parties. Second, experts need to be willing to advise the community about the role they as experts can play, what roles AI can play, and what resources are needed for the project. Outside experts may think they know more about community needs (see Table 1 for many options), but reality suggests that the local community will lose interest if it is not the key player. Assuming, for example, that the local community wants to work on the location of sites that have limited reuse potential because of minor contamination or a poor location relative to transportation access, AI can be used to establish a database, keep it updated, and provide it to interested private and public parties. Third, the project needs to succeed in the short run to establish trust and build momentum.

A successful joint effort can build trust among all parties and allow them to assess the extent to which AI can process and distribute data that would take excessive amounts of time if completed by people. The goal of trust-building is to establish a foundation for longer-term cooperation. If successful, the community and the experts managing the database will undoubtedly face a new challenge as they try to turn a functioning AI platform into a resource for longer-term use. This effort requires maintaining not only person-to-person working relationships, but also the technology and training that allows the AI platform to be useful to the community at large. AI's ability to deliver not only data but summary reports would be a major benefit to all parties. However, they need to read the reports and conclude that they are useful and accurate.

Community–university cooperative agreements focusing on issues such as reusing land and removing legacy environmental threats are common. Much less common are trusting relationships that can withstand changes in topics of interest to both parties. We know that AI's capacity is increasing, but it is likely to become more expensive in cost and time to apply that capacity to solving problems and building trust. This means it will be a difficult challenge to sustain and expand the value of AI in the process of improving local health behaviors and outcomes.

7. Discussion

Americans' collective trust in institutions and political leaders has been declining, with a few exceptions, for more than forty years. The institutions and professionals who deliver health and well-being services are part of that decline, especially those perceived to be greedy. However, the literature and public opinion polls also tell us that nurses, pharmacists, physicians, and social workers who deliver services face-to-face at the local scale, as well as engineers, fire officers, city planners, and other selected groups, enjoy the highest levels of community trust. Their ratings for competence- and values-based trust are high, and both the providers and recipients agree that they need to work harder on building trust through communications. Many government agencies and some nonprofits,

especially in health services, are working on increasing trust because they recognize the benefits for themselves, their organizations, and the public.

AI faces trust-related challenges, as we reported in this review. While it may reduce some costs and increase transparency, it is certainly not a silver bullet for improving community health and well-being. Data quality and quantity and circulating false information are real issues. However, AI can help communities and local governments overcome resource limitations and increase inter-party communications. A suggestion is for communities and experts to work cooperatively to pick topics of interest to both, and then, turn these topics into databases and interactive simulation models that produce results for discussion. Yet, this requires providing targeted resources. Promising topics for such joint community health endeavors are improving food security (e.g., starting a local food bank), providing wellness programs (e.g., starting a silver sneakers program at a local mall), and social and environmental justice considerations in political decision-making. These joint efforts must try to avoid polarizing political labels. Equally challenging is for all parties to avoid acting in a self-serving and arrogant manner.

We chose building and sustaining trust as a core theme for this review because polarized politics and overemphasis on economic cost rather than on health outcomes and community well-being undermine the public confidence needed to reduce disparities. Building trust at the local scale is a way of providing local governments and communities with more control, which we believe many will want to embrace, grow, and sustain.

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References

1. Connelly, B.L.; Crook, T.R.; Combs, J.G.; Ketchen, D.J.; Aguinis, H. Competence- and Integrity-Based Trust in Interorganizational Relationships: Which Matters More? *J. Manag.* **2018**, *44*, 919–945. [CrossRef]
2. Cvetkovich, G.; Earle, T. *Social Trust: Toward a Cosmopolitan Society*; Praeger: Westport, CT, USA, 1995.
3. Earle, T.C. Trust in Risk Management: A Model-Based Review of Empirical Research. *Risk Anal. Off. Publ. Soc. Risk Anal.* **2010**, *30*, 541–574. [CrossRef] [PubMed]
4. Lee, H.-J. The Role of Competence-Based Trust and Organizational Identification in Continuous Improvement. *J. Manag. Psychol.* **2004**, *19*, 623–639. [CrossRef]
5. Poortinga, W.; Pidgeon, N.F. Exploring the Dimensionality of Trust in Risk Regulation. *Risk Anal.* **2003**, *23*, 961–972. [CrossRef] [PubMed]
6. Poortinga, W.; Pidgeon, N.F. Trust, the Asymmetry Principle, and the Role of Prior Beliefs. *Risk Anal. Off. Publ. Soc. Risk Anal.* **2004**, *24*, 1475–1486. [CrossRef] [PubMed]
7. Poortinga, W.; Pidgeon, N.F. Trust in Risk Regulation: Cause or Consequence of the Acceptability of GM Food? *Risk Anal. Off. Publ. Soc. Risk Anal.* **2005**, *25*, 199–209. [CrossRef] [PubMed]
8. Pew Research Center. Trust and Citizen Engagement in Metropolitan Philadelphia: A Case Study. Pew Research Center—U.S. Politics & Policy. Available online: <https://www.pewresearch.org/politics/1997/04/18/trust-and-citizen-engagement-in-metropolitan-philadelphia-a-case-study/> (accessed on 20 December 2023).
9. Pew Research Center. How Americans View Government: Deconstructing Trust. Pew Research Center—U.S. Politics & Policy. Available online: <https://www.pewresearch.org/politics/1998/03/10/how-americans-view-government/> (accessed on 20 December 2023).
10. Chandra, S.; Mohammadnezhad, M.; Ward, P. Trust and Communication in a Doctor-Patient Relationship: A Literature Review. *J. Health Care Commun.* **2018**, *3*, 36. [CrossRef]
11. Burger, J.; Greenberg, M.; Lowrie, K. Risk Communication during Crises and Chronic Exposures. *Risk Anal.* **2022**, *42*, 2345. [CrossRef]
12. Fukuyama, F. *Trust: The Social Virtues and the Creation of Prosperity*, 1st ed.; Free Press: New York, NY, USA, 1996.
13. Putnam, R.D. *Bowling Alone: The Collapse and Revival of American Community*, 1st ed.; Touchstone Books by Simon & Schuster: London, UK, 2001.
14. The Final Push for U.S. Chemical Weapons Demilitarization | Arms Control Association. Available online: <https://www.armscontrol.org/issue-briefs/2022-03/final-push-us-chemical-weapons-demilitarization> (accessed on 20 December 2023).
15. Tyson, A.; Kikuchi, E. Growing Public Concern about the Role of Artificial Intelligence in Daily Life. Pew Research Center. Available online: <https://www.pewresearch.org/short-reads/2023/08/28/growing-public-concern-about-the-role-of-artificial-intelligence-in-daily-life/> (accessed on 20 December 2023).

16. Agley, J. Assessing Changes in US Public Trust in Science Amid the COVID-19 Pandemic. *Public Health* **2020**, *183*, 122–125. [CrossRef]
17. Latkin, C.; Dayton, L.; Strickland, J.; Colon, B.; Ramil, K.; Boosram, B. An Assessment of the Rapid Decline in the US Sources of Public Information about COVID-19. *J. Health Commun.* **2020**, *25*, 764–773. [CrossRef]
18. Conchie, S.M.; Donald, I.J. The Role of Distrust in Offshore Safety Performance. *Risk Anal.* **2006**, *26*, 1151–1159. [CrossRef]
19. Cox, S.; Jones, B.; Collinson, D. Trust Relations in High-Reliability Organizations. *Risk Anal.* **2006**, *26*, 1123–1138. [CrossRef] [PubMed]
20. Leiserowitz, A.A. American Risk Perceptions: Is Climate Change Dangerous? *Risk Anal. Off. Publ. Soc. Risk Anal.* **2005**, *25*, 1433–1442. [CrossRef]
21. O'Dea, A.; Flin, R. Site Managers and Safety Leadership in the Oil and Gas Industry. *Saf. Sci.* **2001**, *37*, 39–57. [CrossRef]
22. Siegrist, M.; Earle, T.C.; Gutscher, H. Test of a Trust and Confidence Model in the Applied Context of Electromagnetic Field (EMF) Risks. *Risk Anal. Off. Publ. Soc. Risk Anal.* **2003**, *23*, 705–716. [CrossRef] [PubMed]
23. Henderson, J.; Ward, P.R.; Tonkin, E.; Meyer, S.B.; Pillen, H.; McCullum, D.; Toson, B.; Webb, T.; Coveney, J.; Wilson, A. Developing and Maintaining Public Trust During and Post-COVID-19: Can We Apply a Model Developed for Responding to Food Scares? *Front. Public Health* **2020**, *8*, 369. [CrossRef] [PubMed]
24. Blair, R.A.; Morse, B.S.; Tsai, L.L. Public Health and Public Trust: Survey Evidence from the Ebola Virus Disease Epidemic in Liberia. *Soc. Sci. Med.* **2017**, *172*, 89–97. [CrossRef]
25. Salim, M.; Peng, X.; Almakhtary, S.; Karmoshi, S. The Impact of Citizen Satisfaction with Government Performance on Public Trust in the Government: Empirical Evidence from Urban Yemen. *Open J. Bus. Manag.* **2017**, *05*, 348–365. [CrossRef]
26. Gutmann Koch, V.; Han, S.A. COVID in NYC: What New York Did, and Should Have Done. *Am. J. Bioeth.* **2020**, *20*, 153. [CrossRef]
27. Uslaner, E.M. Producing and Consuming Trust. *Political Sci. Q.* **2000**, *115*, 569–590. [CrossRef]
28. OECD Health Statistics 2023—OECD. Available online: <https://www.oecd.org/health/health-data.htm> (accessed on 20 December 2023).
29. Gallup Organization. HealthCare System: Gallup Historical Trends. Available online: <https://news.gallup.com/poll/4708/healthcare-system.aspx> (accessed on 21 December 2023).
30. Saad, L. Americans Sour on Healthcare Quality. Available online: <https://news.gallup.com/poll/468176/americans-sour-healthcare-quality.aspx> (accessed on 20 December 2023).
31. Blendon, R.J.; Benson, J.M. Trust in Medicine, the Health System & Public Health. *Daedalus* **2022**, *151*, 67–82. [CrossRef]
32. Chanley, V.A.; Rudolph, T.J.; Rahn, W.M. The Origins and Consequences of Public Trust in Government: A Time Series Analysis. *Public Opin. Q.* **2000**, *64*, 239–256. [CrossRef]
33. Brady, H.E.; Kent, T.B. Fifty Years of Declining Confidence & Increasing Polarization in Trust in American Institutions. *Daedalus* **2022**, *151*, 43–66. [CrossRef]
34. Jones, J.M. Americans Trust Local Government Most, Congress Least. Gallup.com. Available online: <https://news.gallup.com/poll/512651/americans-trust-local-government-congress-least.aspx> (accessed on 20 December 2023).
35. O'Leary, J.; Agarwal, S.; Welle, A. Improving Trust in State and Local Government. Deloitte Insights. Available online: <https://www2.deloitte.com/us/en/insights/industry/public-sector/trust-in-state-local-government.html> (accessed on 20 December 2023).
36. Butcher, C.; Hussain, W. Digital Health Care and the Future. *Future Health J.* **2022**, *9*, 113–117. [CrossRef] [PubMed]
37. Dona, S.; John, K. Suburbia: Too Many Deer or Too Many People? *N. J. Outdoors* **1989**, *16*, 28–32.
38. NETS and BOLTS: Controversial Method of Deer Control in Princeton. Trentonian. Available online: <https://www.trentonian.com/2001/11/26/nets-and-bolts-controversial-method-of-deer-control-in-princeton/> (accessed on 24 December 2023).
39. Brenan, M. Nurses Retain Top Ethics Rating in U.S., But Below 2020 High. Gallup.com. Available online: <https://news.gallup.com/poll/467804/nurses-retain-top-ethics-rating-below-2020-high.aspx> (accessed on 20 December 2023).
40. Herzlinger, R.E. Can Public Trust in Nonprofits and Governments Be Restored? Harvard Business Review. 1 March 1996. Available online: <https://hbr.org/1996/03/can-public-trust-in-nonprofits-and-governments-be-restored> (accessed on 20 December 2023).
41. Berman, G. Leaders Must Confront Declining Trust in the Nonprofit World—Before It's Too Late. The Chronicle of Philanthropy. Available online: <https://www.philanthropy.com/article/leaders-must-confront-declining-trust-in-the-nonprofit-world-before-its-too-late> (accessed on 20 December 2023).
42. Eisenstein, L. Nonprofit Embezzlement Cases: Examples to Learn from. Available online: <https://www.boardseffect.com/blog/nonprofit-embezzlement-cases/> (accessed on 5 February 2024).
43. Åström, J. Participatory Urban Planning: What Would Make Planners Trust the Citizens? *Urban Plan.* **2020**, *5*, 84–93. [CrossRef]
44. ABIM Foundation. AIBM Foundation Building Trust: Focusing on Trust to Improve Health Care. Available online: <https://abimfoundation.org/what-we-do/rebuilding-trust-in-health-care> (accessed on 20 December 2023).
45. FEMA Hazard Mitigation Planning; Department of Homeland Security FEMA: Washington, DC, USA, 2024.
46. Chen, J.; Greenberg, M. Cascading Hazards and Hazard Mitigation Plans: Preventing Cascading Events in the United States. *Risk Hazards Crisis Public Policy* **2022**, *13*, 48–63. [CrossRef]
47. Hendrickson, K.A.; Francis, K.A.; Clarke, A.M. Public Trust, Community Resilience, and Disaster Response in the U.S. Virgin Islands. Available online: <https://hazards.colorado.edu/public-health-disaster-research/public-trust-community-resilience-and-disaster-response-in-the-u-s-virgin-islands> (accessed on 20 December 2023).

48. Kumar, D.; Pratap, B.; Aggarwal, A. Public Trust in State Governments in India: Who Are More Confident and What Makes Them Confident about the Government? *Asian J. Comp. Politics* **2021**, *6*, 154–174. [\[CrossRef\]](#)
49. Beshi, T.D.; Kaur, R. Public Trust in Local Government: Explaining the Role of Good Governance Practices. *Public Organ. Rev.* **2020**, *20*, 337–350. [\[CrossRef\]](#)
50. Jameel, A.; Asif, M.; Hussain, A. Good Governance and Public Trust: Assessing the Mediating Effect of E-Government in Pakistan. *Lex Localis J. Local Self-Gov.* **2019**, *17*, 299–320. [\[CrossRef\]](#)
51. Adams, R.M.; Evans, C.M.; Mathews, M.C.; Wolkin, A.; Peek, L. Mortality from Forces of Nature among Older Adults by Race/Ethnicity and Gender. *J. Appl. Gerontol.* **2021**, *40*, 1517–1526. [\[CrossRef\]](#) [\[PubMed\]](#)
52. Gozgor, G. Global Evidence on the Determinants of Public Trust in Governments during the COVID-19. *Appl. Res. Qual. Life* **2022**, *17*, 559–578. [\[CrossRef\]](#) [\[PubMed\]](#)
53. Feinberg, D.S. What Factors Predict the Quality of Hazard Mitigation Plans in Washington State? *Clim. Chang.* **2021**, *164*, 1. [\[CrossRef\]](#)
54. Malesic, M. The Concept of Trust in Disasters: The Slovenian Experience. *Disaster Prev. Manag. Int. J.* **2019**, *28*, 603–615. [\[CrossRef\]](#)
55. Mackay, R.; Mavisakalyan, A.; Tarverdi, Y.; UNU-WIDER. *Trust a Few: Natural Disasters and the Formation of Trust in Africa*; WIDER Working Paper; UNU-WIDER: Helsinki, Finland, 2023; Volume 2023, p. 31. [\[CrossRef\]](#)
56. How Is AI Being Used in the Field of Sustainability and Environmental Protection? Available online: <https://www.quora.com/How-is-AI-being-used-in-the-field-of-sustainability-and-environmental-protection> (accessed on 20 December 2023).
57. Fondrie-Teitler, S.; Jayanti, A. Consumers Are Voicing Concerns about AI. Federal Trade Commission. Available online: <https://www.ftc.gov/policy/advocacy-research/tech-at-ftc/2023/10/consumers-are-voicing-concerns-about-ai> (accessed on 20 December 2023).
58. Brown, P. When the Public Knows Better: Popular Epidemiology Challenges the System. *Environ. Sci. Policy Sustain. Dev.* **1993**, *35*, 16–41. [\[CrossRef\]](#)
59. Ceccaroni, L.; Bibby, J.; Roger, E.; Flemons, P.; Michael, K.; Fagan, L.; Oliver, J.L. Opportunities and Risks for Citizen Science in the Age of Artificial Intelligence. *Citiz. Sci. Theory Pract.* **2019**, *4*, 29. [\[CrossRef\]](#)
60. Chari, R.; Matthews, L.J.; Blumenthal, M.S.; Edelman, A.F.; Jones, T.M. *The Promise of Community Citizen Science*; RAND Corporation: Santa Monica, CA, USA, 2017; Available online: <https://www.rand.org/pubs/perspectives/PE256.html> (accessed on 20 December 2023).
61. Harrington, C.; Erete, S.; Piper, A.M. Deconstructing Community-Based Collaborative Design: Towards More Equitable Participatory Design Engagements. *Proc. ACM Hum. Comput. Interact.* **2019**, *3*, 216:1–216:25. [\[CrossRef\]](#)
62. Koekkoek, A.; Ham, M.V.; Kleinhans, R. Unraveling University-Community Engagement: A Literature Review. *J. High. Educ.* **2021**, *25*, 3–24.
63. Lotfian, M.; Ingensand, J.; Brovelli, M.A. The Partnership of Citizen Science and Machine Learning: Benefits, Risks, and Future Challenges for Engagement, Data Collection, and Data Quality. *Sustainability* **2021**, *13*, 8087. [\[CrossRef\]](#)
64. Susman, G.I.; Evered, R.D. An Assessment of the Scientific Merits of Action Research. *Adm. Sci. Q.* **1978**, *23*, 582–603. [\[CrossRef\]](#)
65. Wallerstein, N.B.; Duran, B. Using community-based participatory research to address health disparities. *Health Promot. Pract.* **2006**, *7*, 312–323. [\[CrossRef\]](#) [\[PubMed\]](#)
66. Vohland, K.; Land-Zandstra, A.; Ceccaroni, L.; Lemmens, R.; Perelló, J.; Ponti, M.; Samson, R.; Wagenknecht, K. The Science of Citizen Science Evolves. In *The Science of Citizen Science*; Vohland, K., Ed.; Springer: Cham, Switzerland, 2021; pp. 1–12. [\[CrossRef\]](#)
67. Nickerson, R.S. Confirmation Bias: A Ubiquitous Phenomenon in Many Guises. *Rev. Gen. Psychol.* **1998**, *2*, 175–220. [\[CrossRef\]](#)

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