TEACHERS' AND STUDENTS' PERCEPTION OF TECHNOLOGY-MEDIATED CARE IN THE FIGHT AGAINST COVID-19: AN ANALYSIS OF MENTAL HEALTH

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ABSTRACT

Faced with the difficulty presented in guiding and monitoring patients affected by covid-19, many countries have applied wireless technologies to fight the virus effectively. With this in mind, the University of the State of Amazonas (UEA) established the service of a technology to clarify doubts about the coronavirus and provide psychological help to the population. The study sought to analyze the perception of professors and students via

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chatbot about mental health demands during the COVID-19 pandemic. This is a cross-sectional study with a qualitative approach, carried out at the Laboratory of Health Technology and Education (LABTECS) of the School of Health Sciences, and was divided into two phases: literature review and interview with professors and students. In phase 1, a total of 2035 articles were identified, of which 1022 were not associated with the proposed theme, 988 did not answer the guiding question and 16 publications were unavailable in full, 41 articles were selected for evaluation and eligibility, 31 articles did not respond to the research objective, and finally 10 articles were included in the analysis. In phase 2, the interviewees reported identifying demands of anxiety, depression and fear on the part of users, forwarding via chatbot to the specialized mental health team to follow up on the follow-up, show that the chatbot was fundamental for mental health guidance during COVID-19 and reveal that they have expanded their knowledge about health technologies. Therefore, wireless technologies proved to be useful for mental health demands, so that health professionals were able to monitor patients effectively, in addition to the need for reflections on accessibility to online services and mastery of the use of wireless technologies by the population.

Keywords: Mental health. Information technology. Technology. COVID-19.

INTRODUCTION

Since its first confirmed case of infection in February 2020, the new COVID-19 virus called SARS-CoV-2 has posed numerous challenges for the country's population. Thus, it is necessary to recognize that the pandemic scenario affected all aspects of individuals' health, including mental health, requesting actions to combat the pandemic, but also interventions that would help professionals to adopt adaptive strategies to skillfully manage the challenges imposed, whether physical and/or emotional (THERENSE, PERDOMO, FERNANDES, 2021).

With regard to prevention measures, the Ministry of Health launched a series of campaigns together with the dissemination of epidemiological data with the objective of informing the population about transmission issues in case of contagion of the disease. The main suggestion is social distancing as a measure to prevent the spread of COVID-19, with the population being widely oriented about the need to remain in quarantine within their home environments. As a result, lockdown measures and information about the health crisis caused by COVID-19 have resulted in consequences such as stress, fear, and concern for a large part of the population, noting the increase in psychological and emotional symptoms of distress around the world (DUARTE, et, al.; 2020).

It is worth remembering that before the pandemic, Latin America already had great psychosocial needs that were not met and were expressed in mental problems, difficulties and disorders that could often be attributed to deep social inequalities and the markedly limited economic capacity of governments to deal with their respective situations. In this sense, five events were identified as collaborators for manifestations of mental suffering (stress, depression, fear, anxiety, insomnia) during the emergence of the new coronavirus: the confirmation that it would be transmitted between humans; the implementation of isolation measures as the only way to reduce the spread of the disease; and the confirmation by the World Health Organization (WHO) that COVID is a pandemic (EGEDE, RUGGIERO, FRUEH, 2020; PAVANI, et, al.; 2021).

A survey conducted with 799 predominantly female (82.7%) identified that almost 70% of the participants reported having been in mental health monitoring at some time in their lives or were currently. Around 25% have a diagnosis of mental disorder. Regarding COVID-19, 23.8% are part of the risk group for the disease and 43.4% live in the same house as people in the risk group. A cross-sectional study with adult individuals living in Brazil who participated in the virtual health survey ConVid - Behavior Survey, from April 24 to May 24, 2020, found that during the quarantine period, frequent feelings of sadness or depression (35.5%), isolation (41.2%) and anxiety (41.3%) considerably affected the mental

health of such participants. In this way, it can be seen that a part of the population already demonstrated a certain fragility, which could consequently be enhanced due to the health crisis scenario (DUARTE, et al.; 2020; MALTA et al.; 2020).

Given the difficulty presented in guiding and monitoring patients affected by COVID-19, many countries apply wireless technologies to fight the virus effectively. Wireless technologies allow access to the patient's continuous care while maintaining patient security and privacy in a health crisis. On platforms such as telehealth services, providers make use of smartphone teleconferences or examine patients' electronic health records for proper diagnosis and evaluation of treatment outcomes. In today's world, many healthcare providers are using teleconferencing to connect virtually with their patients without physical contact (BASHEERUDDINASDAQ, et al.; 2021).

A study guided by expert occupational therapist Sonia Maria Leonardi Ferrari published in 2022, presents an experience of occupational therapy with telehealth groups in Brazil, supported by the Dynamic Occupational Therapy Method, seeking to discuss the use of technology during the Covid-19 pandemic, demonstrating that occupational therapy telehealth group work in mental health settings has many benefits, especially during the pandemic crisis, fostering a sense of belonging, which helped customers to get through this context (FERRARI, et al.; 2022).

However, the pandemic, as well as other periods of crisis, serves not only as a potential analyzer of the institution, but also the experiences direct attention to society's mental health issues, power relations, and practices instituted in the services, with the aim of generating transformative instituting forces. In view of this complexity, multifaceted actions are necessary, with the main objective of breaking with the instituted asylum and resisting these forces that weaken psychosocial care (SILVANO, et al.; 2022).

With this in mind, the Laboratory of Technology in Health and Education (LABTECS) located at the School of Health Sciences (ESA) of the University of the State of Amazonas (UEA) established the chatbot service with the objective of serving the population in the period of the epicenter of the epidemic in the Amazon, in order to clarify doubts in accordance with the recommendations of the World Health Organization,   the Ministry of Health and the Health Surveillance Foundation of Amazonas on the control and community transmission by the new coronavirus/COVID-19 to Amazonian society, in addition to providing psychological help to individuals who needed emotional support. The initiative was a partnership between UEA and the State Government and the Health Surveillance Foundation (HEALTH SURVEILLANCE FOUNDATION, 2020).

The technology used through the chatbot was responsible for triaging and forwarding via telephone call to serve the population, allowing the health team to focus on other tasks. In this type of service, the service pre-defines telephone calls, records user interactions and is able to filter and qualify users of the Unified Health System. Thus, interactions follow flows directed to services performed by the technology itself and directed when there are specific issues that the system cannot solve, being transferred to the team of attendants (teachers and students). Thus, the study in question sought to identify "What are the difficulties in the care and referral of mental health demands by professors and students who worked in the chatbot service during the COVID-19 pandemic?

METHOD

This study is an excerpt from the research "IMPLANTATION AND IMPLEMENTATION OF A MOBILE TECHNOLOGY FOR THE CARE OF ENDEMIC DISEASES AT THE UNIVERSITY OF THE STATE OF AMAZONAS". This research was approved by the Research Ethics Committee of the CEP-UEA under opinion No. 4.148.014.

This is a cross-sectional study with a qualitative approach. In the cross-sectional study, qualitative and/or quantitative data collected over a certain period of time are analyzed. Data are collected from a sample population or in a predefined subset that have common characteristics, except for the variable being studied. This variable is the one that remains constant throughout the study (ZANGIROLAMI, 2018).

The study took place at the Laboratory of Technology in Health and Education (LABTECS) located at the School of Health Sciences (ESA) of the University of the State of Amazonas (UEA) during the period from July 2022 to June 2024. The surveyed population had 11 chatbot operators, among these are nine professors and two health students who worked in the face-to-face and remote service during the COVID-19 pandemic between April 2020 and July 2021.

The first phase of the study: a literature review was carried out to understand the aspects of the study, thus the following occurred: elaboration of the guiding question, search or sampling in the literature, data collection, analysis of the included studies and discussion of the results.

To construct the guiding question, the PICo strategy was used, which represents an acronym for (P) patient/population, (I) intervention/interest, (C) comparison/context, and (O) outcomes. In this study, the population was the professors and students in the health area who worked in technology-mediated care during the COVID-19 pandemic, the interest was to evaluate the impact of the service performed by the mentioned population on mental

health demands during the COVID-19 pandemic; the context was online care during the COVID-19 pandemic. Thus, the research question is: What is the importance of the use of wireless technologies for the orientation of the general public in mental health demands during the COVID-19 pandemic? (TRICCO, et al.; 2018)

To answer the guiding question of the review, a search was carried out through the Virtual Health Library (VHL), the *Scientific Electronic Library Online* (SciELO), Latin American and Caribbean Literature on Health Sciences (LILACS) and the National Library of Medicine (PubMed) databases by crossing the following descriptors controlled: mental health, wireless technologies, health technologies, and COVID-1. Through these descriptors, the studies were analyzed, excluding those that did not meet the criteria and the research proposal, as well as duplicate articles. The inclusion criteria were studies that adapted to articles with full text, articles that dealt with the theme and published in the last 2 years (2020 to 2022).

After the process of filtering the studies, analysis was used through research phases such as database survey, exploration of the material, selective reading, verifying the adequacy of the article with the theme of the study. The selection of articles was conducted in the form of a flowchart with details according to the *Preferref Reporting Items for Systematic Review and Meta-Analyses* (PRISMA) methodology. In this stage, 2035 publications were found for analysis, of which, after reading the abstracts, 10 articles were selected for reading in full. Table 1 presents the summary of the results obtained in each stage:

Figure 1 - Flowchart of the selection of articles for the study of the Integrative Review by PRISMA. Manaus-AM, 2024
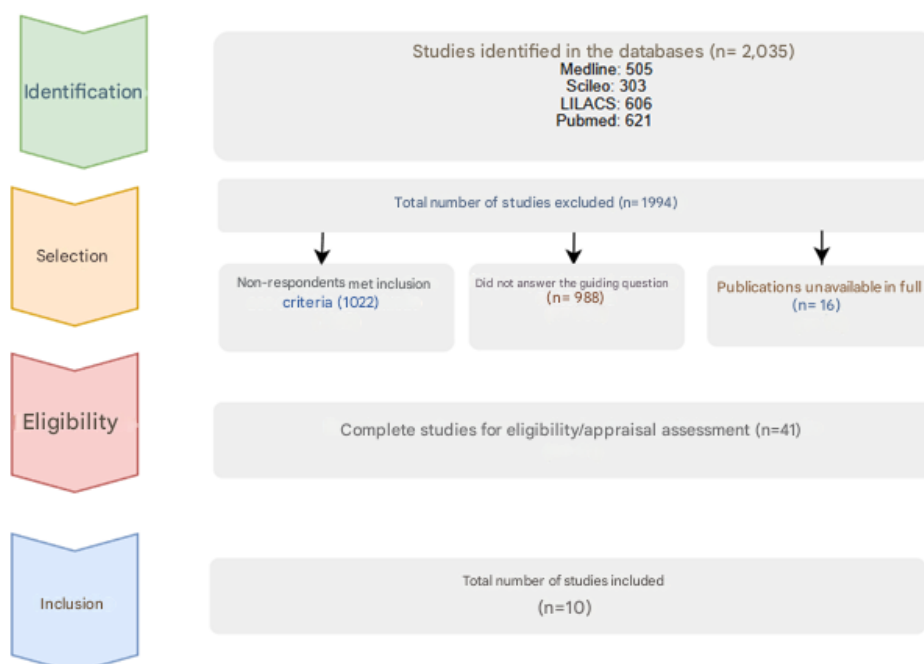
RESULTS

The publications selected from the 10 articles to identify the importance of the use of wireless technologies for the orientation of the general public in mental health demands during the COVID-19 pandemic are described in (Chart 1).

Chart 1 - Description of publications according to year, title and Results. Manaus- AM, 2024.

Articles	Year of publication	Title	Results
1	2020	Supporting people with severe mental health conditions during the COVID-19 pandemic: considerations for low- and middle-income countries using telehealth case management	The study analyzes the benefits of these digital technologies in reducing the pandemic and "how" different sectors have adapted to them in a shorter period. The role of social media and television in ensuring global connectivity and serving as a common platform to share authentic information among the general public has been summarised.
2	2021	Online psychological on-call duty: the experience of the UEL Psychological Clinic in the context of Covid-19	The scope of this practice proved to be important for listening to and welcoming the psychic suffering caused by the pandemic, especially for university students who are dealing with insecurities and frustrations, having their life projects crossed by the new world scenario. Some limits of the online Psychological Emergency Service were listed, especially in relation to technological complications. It is hoped that this narrated experience will inspire other services to offer this type of care, or improve their offer, in pandemic times, in order to contribute to the mental health of the population.
3	2021	The Impact of Technology-Enabled Care Coordination in a Complex Mental Health System: A Local System Dynamics Model	Technology-based care coordination is expected to reduce hospitalizations for self-harm and suicide deaths by 6.71% (95% range: 5.63%-7.87%), mental health-related ER presentations by 10.33% (95% range: 8.58%-12.19%), and the prevalence of high psychological distress by 1.76 percentage points (95% range: 1.35-2.32 percentage points).
4	2021	Online Mental Health Interventions in Times of COVID-19: Systematic Review	The results showed that adults and health professionals were the ones who most sought mental health care, through telephone calls and video calls. The main motivations for seeking assistance were feelings of anxiety, depression, panic, eating disorder, and ADHD. Online consultations showed positive and effective effects on mental health care for adults with psychological problems. These promising findings pose challenges to professional ethical issues, especially regarding the care of high-risk patients. In addition, limitations of online care regarding access to the internet and the mastery of

Articles	Year of publication	Title	Results
			technology by the professional and the user should be considered.
5	2021	Can technological advancements help to alleviate COVID-19 pandemic? a review	The study discusses the benefits of these digital technologies in reducing the pandemic and "how" different sectors have adapted to them in a shorter period. The role of social media and television in ensuring global connectivity and serving as a common platform to share authentic information among the general public has been summarised. The role of the World Health Organization and governments globally in preventing the spread of fake news, raising awareness and decreasing the severity of COVID-19 was discussed.
6	2022	Use of digital technologies in mental health during COVID-19	It starts from a critical look at the migration of care face to face to the Internet environment, emphasizing: international experiences in the use of digital technologies in the context of the pandemic; challenges in online consultations, with emphasis on the importance of the ethical, technical/technological and clinical domains that are recurrent in the international literature; challenges and perspectives of the use of technologies. It is essential to develop strategies with government incentives, aiming at the quality of the services offered and the guarantee of adequate hybrid training.
7	2022	COBALT: Supporting the mental well-being of the health care workforce with technology-facilitated care during Covid-19 and beyond	Two-thirds of health workers facing the clinical demands of the Covid-19 pandemic response experience psychiatric symptoms, including post-traumatic stress, anxiety, substance use, depression, insomnia, and suicide.1,2 Compounding the situation, access to mental health services is poor, quality is variable, and stigma is prevalent. COBALT, a digital mental health and wellness platform developed at Penn Medicine, is designed to support healthcare professionals by offering a combination of self-directed resources, virtual group sessions, and one-on-one consultations with a tiered care model from providers, including peers, resilience coaches, psychotherapists, and psychiatrists.
8	2022	ePSICONUT: An e-Health Programme to Improve Emotional Health and Lifestyle in University Students	The results indicated that the professionally supervised use of eHealth tools was associated with better psychological well-being, less anxiety and depression, and better lifestyle habits (such as diet quality), even in situations of stress and change, such as the circumstances of the COVID-19 pandemic. However, more studies are needed to validate and promote the use of eHealth-based intervention programmes.

Articles	Year of publication	Title	Results
9	2022	Telemedicine Interventions as an Attempt to Improve the Mental Health of Populations during the COVID-19 Pandemic-A Narrative Review	The studies included participants from seven countries and the total number of participants in the included studies was 687. The content of these intervention programs includes both established psychotherapeutic programs and new interventions. Remote support was implemented through three approaches: phone/video calls, mobile applications and internet-based programs. The results of the included studies indicate a higher or equal efficacy of telemedicine
10	2022	Virtual Care for Behavioral Health Conditions	The COVID-19 pandemic has highlighted the urgent need for behavioral health services. A substantial part of mental health care transitioned to virtual care during the COVID-19 pandemic, remains virtual today and will continue to be so in the future. Mental health needs continue to increase and there is increasing evidence demonstrating the effectiveness of virtual healthcare for behavioural health issues at the system, provider and patient level. There is also a growing understanding of the obstacles and challenges to virtual behavioral health care.

The sample of this study was composed of 10 original articles. Regarding the year of publication, 1 article was observed in 2020, 4 in 2021 and 5 in 2022.

Of these data presented, 7 are observational studies, 2 of which are review studies (01 systematic review and 01 narrative review) focusing on mental health, especially in a time of Covid-19 and its specificities.

As for the countries of origin of the studies, they are distributed as follows: 3 studies were produced in Brazil, 3 in the United States, 2 in India, 1 in the Dominican Republic and 1 in Poland.

In the second phase of the research, the interview script was used with 8 questions in which each question was related to the experience of professors and students in the health area working in the chatbot service during the COVID-19 pandemic. Thus, the operators' understanding of the technology and the referrals made by teachers and students during their performance in the service were evaluated.

Finally, the data analysis occurred from the exploration of the content previously selected during the literature review, thus the treatment and interpretation of the results obtained through the Bardin method was carried out.

Based on the previously developed analysis, interviews were conducted with 11 operators of the chatbot service, in order to evaluate the protocols and referrals of mental

health demands during the COVID-19 pandemic. Thus, the interview took place at the Laboratory of Technology in Health and Education (LABTECS) of the School of Health Sciences (ESA) located at the University of the State of Amazonas (UEA). The descriptive analysis allowed the identification of six subjective categories as follows:

DECISION TO VOLUNTEER TO WORK IN TECHNOLOGY-MEDIATED CARE DURING THE PANDEMIC

P3   "After observing the need to offer a service to people who were at home and could not go to a health unit. As an active person in the pandemic, we saw the situation (in the units), so that led me to participate in the service"

P6   "To guide the population on the correct attitudes according to what is established by the WHO, but above all to help people who came to us with numerous questions about prevention and treatment"

P5   "First, it was the desire to help and contribute to society. In addition to giving back, since we study at a public university and it becomes our duty"

KNOWLEDGE ABOUT ANY ACTIVITY USING CHATBOT-TYPE TECHNOLOGY

P1   "No, the chatbot was my first contact with this type of technology in health care"

P2   "In cases of difficulty in some service I used the chatbot to help, but as an assistant it was the first time"

P3   "During my academic journey I had experiences in the development of software for health care, but the chatbot came some time later in the midst of the pandemic crisis"

MOST FREQUENT MENTAL HEALTH DEMANDS IDENTIFIED BY TEACHERS

P3   "In the first wave, more cases of anxiety were identified, while in the second wave, most of them were signs and symptoms characteristic of depressive conditions"

P10 "Many people came to the service reporting 'shortness of breath', so after checking the signs and symptoms with a professional, it was understood that it was anxiety"

P4   "All users who used the service for clinical needs also had some psychological need. It was known from the answers that there was some psychic suffering, or the users themselves reported feeling depressed, distressed or afraid"

IDENTIFIED CONDUCTS IN MENTAL HEALTH AND THE DEMANDS OF PROFESSIONALS

P9   "Primary guidance was given to improve the condition, such as helping with breathing control, among other methods"

P10 "During the first wave, there was no planning regarding these cases, and only a reception was carried out with the client. In the second wave, users were directed to a specialized team of psychologists."

P7   "At a certain point we started to work with two teams, one of which specializes in mental health care. Thus, after identification, the referral was carried out by the chatbot itself"

THE ROLE OF THE CHATBOT SERVICE IN MENTAL HEALTH DEMANDS

P7   "Every initiative that took place in order to aggregate was very important. The chatbot has helped many people, in addition to providing this interactivity between teachers and students. However, it could have been more extended to the interior of the state"

P8   "The chatbot has prevented many people from risking themselves outside their homes, sometimes needing small and welcoming guidance only"

P9   "It was impossible to charge the professionals who were serving within the health services for this type of reception, so the chatbot was fundamental in carrying out these guidelines"

LEARNINGS IN RELATION TO MENTAL HEALTH DEMANDS AND REFERRALS DURING THE WORK IN THE CHATBOT

P2   "There were countless learnings, such as valuing the human being in its fullness, sharing pain and being a professional having an attitude based on science, especially at a time when science was being questioned"

P3   "I had some difficulty in using technology, so understanding how the system worked became one of my great learnings, so I was able to learn about the benefits of technologies in favor of health"

DISCUSSION

In view of the reports, it is clear that professors and students had their first contact with this type of technology from the chatbot service. Thus, demonstrating their inexperience in the use of health technologies. This fact can become an obstacle, being faced equally by operators of other wireless technologies used to serve the population during the pandemic, since during their services they faced a technical learning curve when providing care virtually (LIVESEY, et al.; 2022).

However, it is perceived that even with little experience in the care service, the professors and students had a common goal: to help the population in the orientations, so that they would reduce the capacity of the health units compared to the previous scenario, since, although technologies for the provision of behavioral health care were not a method developed only during the first wave, virtual services were not widely used until then, and this rate changed significantly during the pandemic (PALMER, et al.; 2022).

In the face of the pandemic, when faced with the unknown and in the process of mourning, several users demonstrated fragility, perceiving the need for specialized care for these patients, thus following the psychological aspects, a statistically significant increase in depressive and anxiety signs and symptoms was observed, in addition to a decrease in subjective well-being, reiterating the need for preventive measures guided by a method that showed efficacy greater than or equivalent to traditional interventions. Thus, the supports implemented had direct and indirect approaches such as phone calls, video calls, mobile

applications, and virtual programs such as the chatbot itself (CANTISANO, et al.; 2022; RUTKOWSKA, et al.; 2022).

Findings such as these suggest that care management enabled by technologies helps to improve mental health and alleviates the burden on the unified health system. Studies show that compared to the increase in service capacity and standard telehealth, this management reduced more psychological problems, hospitalizations for self-mutilation, hospitalizations for mental disorders, and the prevalence of high psychological distress. It was observed that services mediated by technology such as chatbots were important in reducing the number of patients in health units, being essential for welcoming the population (IORFINO et al.; 2021; THOMAS, et al.; 2021).

However, although telehealth is promoted as a solution to improve access to health, technological barriers and the lack of trained professionals can hinder or prevent access to these services, highlighting the crucial importance of global actions for the promotion of mental health. Thus, it is noteworthy that most of the interviewers obtained knowledge about how to handle wireless technologies correctly, having their skills developed during the service with the support of the technical team present, aiming at a work focused on valuing science and welcoming others, despite such barriers (SALUM, et al.; 2020).

The experience described has contributed significantly to the improvement of the training of health professionals and academics in the use of technologies for care, in addition to promoting reflections and welcoming practices in situations of major catastrophes. Intensive case management via telehealth has proven to be a viable strategy in public health institutions, especially in low- and middle-income countries. This approach can mitigate the elevated risks of psychiatric instability due to COVID-19-related stress in vulnerable populations (SILVA, et al.; 2022; SECCHI, et al.; 2021).

International experiences in technology-mediated mental health care reveal essential aspects, both in the individual dimension, which requires ethics and technological-clinical mastery, and in social and political aspects. The prolonged context of social distancing has brought significant changes in the use of digital technologies. In view of this, professors and students understand that safe actions are indispensable, maintaining the ethical commitment to a qualified performance in the field of mental health (ORTOLAN, et al.; 2021).

CONCLUSION

Technology-mediated services proved to be efficient, being fundamental for the general care of the population, maintaining social distancing recommendations during the

COVID-19 pandemic. Wireless technologies proved to be useful for mental health demands, so that health professionals could effectively monitor psychiatric and psychologically fragile patients, being able to offer continuous and safe support, minimizing the impact of the pandemic on the mental health of the population.

Health technologies are essential in several cases of care and during the pandemic, they were indispensable for reducing the capacity in health services, in addition to facilitating the dissemination of information based on science and the recommendations of the World Health Organization (WHO). Rapid communication about preventive measures, symptoms, and treatments was crucial to educate the population and control the spread of the virus.

Thus, the need for reflections on the accessibility to online services and the mastery of the use of wireless technologies by the population is highlighted, with special attention to the interior of the state. Inequality in access to the internet and the use of technological devices can create significant barriers, preventing many individuals from fully enjoying the benefits of health technologies.

Thus, it is necessary to invest in digital infrastructure and technological training programs to ensure that everyone can access these services equitably. The pandemic has highlighted the importance of technologies in healthcare, but it has also highlighted the need to make these resources accessible to the entire population, regardless of their geographic location or socioeconomic status.

In short, while healthcare technologies have proven vital during the pandemic, the future requires an ongoing effort to ensure that these innovations reach everyone. Only in this way can we build a health system that is more resilient, inclusive, and prepared to face future public health challenges.

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