

Emerging AI-Based Approaches Create New Opportunities to Identify and Support Caregivers



By identifying informal caregivers' needs, AI-based approaches can support earlier, more targeted delivery of preventative care and essential support services.

An estimated 63 million Americans—or approximately one in four—provide care for someone with whom they have a personal relationship, typically a family member or friend (i.e., are informal caregivers).¹ People provide informal care for a range of complex and interrelated reasons.^{2,3} Being an informal caregiver can bring fulfillment and the opportunity to “give back” to a loved one, but it can also be stressful, adversely affecting the caregiver’s emotional, mental, and physical health, particularly when assisting with demanding or complex needs.⁴



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Informal caregiving is often unpaid and provided separately from formal care (i.e., care provided by trained professionals), making informal caregivers and their needs difficult to identify. Studies globally have found that informal caregivers experience higher burden, stress, physical strain, and total caregiving time compared to formal caregivers.³⁻⁵ Although nearly half (47%) of unpaid caregivers of

older adults would benefit from guidance and assistance from professional caregivers, only 15% actually receive this help.⁵ The health of the care recipient can also overshadow informal caregivers’ health needs, with one study finding that physicians in outpatient settings failed to detect serious mental health conditions, such as depression, in approximately one third of informal caregivers.⁶

Steps toward improved support for informal caregivers

A range of interventions have the potential to improve informal caregiver well-being. A 2020 meta-analysis found that nonpharmacological interventions such as educational training, cognitive behavioral therapy, support groups, and respite care reduced caregiver anxiety and depression and improved caregiving ability.⁷ These interventions can also have a positive impact on care systems and the economy. For example, the Bell Policy Center estimated that providing caregivers in Colorado with resources such as training, respite, and workplace supports would reduce nursing home utilization and increase informal caregivers’ workforce participation, thereby saving the state \$130 million to \$280 million by 2030.⁸

To maximize the positive impacts of interventions on caregivers and society, researchers and healthcare providers need effective tools to identify informal caregivers who would benefit from targeted support.

a2 PILOT AWARDS PROJECT HIGHLIGHT

Using patient portals to help identify informal caregivers who may benefit from support

Patient portals provide older adults with access to both medical billing and their electronic health records (EHRs) to help manage their care. Informal caregivers often use patient portals to communicate with care recipients' clinicians, access health information, and coordinate care, especially when they care for older adults with serious health conditions or nearing end of life.⁹ Notably, older adults with dementia and heart failure are significantly more likely than other older adults to share access to their patient portals with their caregivers.^{10,11}



Although patient portals could provide a way for healthcare providers to identify, communicate with, and provide resources and support to informal caregivers, many patient portals are not designed to facilitate caregiver access and do not allow caregivers to create their own accounts (i.e., proxy accounts). Instead, caregivers use their care recipients' login information, making their portal use difficult to distinguish from care recipient use.¹² As a further challenge, communication between clinicians and users in patient portals is often unstructured,

such as free-text medical notes, which can be more difficult to search and analyze compared to structured data such as lab results and standardized diagnosis codes. New and emerging technologies, including AI, may help overcome these challenges.

As a part of the first cohort of a2 Pilot Awards technology development projects, a team from the **University of Colorado** and **Kaiser Permanente** received funding to analyze patient portal data using natural language processing (NLP)—a type of AI that helps computers recognize, interpret, and generate human language. The team's AI-based approach aims to identify informal caregivers who could benefit from interventions delivered through patient portals. Dr. Jennifer Portz, an assistant professor researching the use of digital health tools in palliative care to support patients and their caregivers, and Dr. Rebecca Boxer, a practicing geriatrician and medical director of clinical trials at the Kaiser Permanente Colorado Institute for Health Research, led the team in using NLP to analyze the free-text notes and messages in patient portals to identify caregiver information.

In an initial study, the team demonstrated that both structured and unstructured EHR data provide crucial language and keywords that can help identify various types of informal caregivers. In future work, the team aims to validate its NLP model across diverse healthcare settings and to use the model to identify informal caregivers who do not live with the care recipient (e.g., adult offspring, friends, and extended family) and thus may be missed by existing identification methods.¹³

a2 PILOT AWARDS PROJECT HIGHLIGHT

AI-powered prediction of depression and burden to enable more personalized support for informal caregivers

Depression and anxiety are common among informal caregivers of older adults with dementia and are linked with worse caregiver health and increased healthcare utilization and costs.^{14,15} Informal caregivers’ verbal interactions with both clinicians and care recipients can offer a window into caregivers’ mental and physical health. AI-enabled analysis of these interactions could help clinicians identify caregiver burden and detect conditions such as depression and anxiety earlier and more effectively.

As a part of the fourth a2 Pilot Awards cohort, Dr. Nancy Hodgson, a professor at the **University of Pennsylvania** School of Nursing, is collaborating with colleagues in the University of Pennsylvania School of Medicine Department of Informatics to develop and test an AI system designed to predict depression, overall burden, and healthcare utilization among informal caregivers of older adults with dementia. This collaboration aims to equip clinicians with early signals of caregiver burden, enabling earlier interventions and personalized care plans.

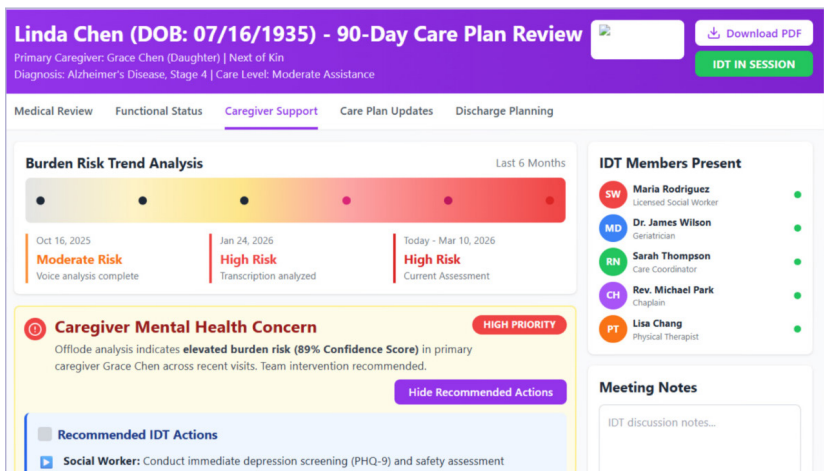


Image courtesy of Nancy Hodgson.

The team will evaluate three NLP approaches to analyze spoken interactions between informal caregivers, older adults living with dementia, and clinicians. These approaches are intended for deployment in the home to provide ongoing, nonintrusive assessment of caregivers’ needs. Dr. Hodgson and colleagues plan to assess how accurately each approach identifies signals of caregiver depression and burden and predicts future healthcare utilization in previously recorded

caregiver-clinician interactions. They also aim to identify which aspects of these interactions predict future caregiver health outcomes in order to determine the most effective NLP methodology for this purpose.

a2 PILOT AWARDS PROJECT HIGHLIGHT

Leveraging AI to enhance a coaching support service for informal dementia caregivers

Evidence-based caregiver support interventions such as psychoeducational training and peer support groups have been shown to reduce caregiver burden and stress. However, only one in five informal caregivers report receiving training, which has traditionally been delivered face-to-face by licensed social workers or clinicians.¹ Scaling these interventions, such as via smartphone, could increase support and

enhance well-being for informal caregivers lacking access to personal coaching, training, and formal support groups—especially those caregivers living in rural America.



The healthcare startup **Kinto** received funding as a part of the second a2 Pilot Awards cohort to create and evaluate an AI-enhanced version of a smartphone app that delivers one-on-one expert coaching and peer support for informal caregivers of people living with dementia. The app uses messaging and video gatherings to provide caregivers with easy-to-access support.

Joseph Chung, founder and CEO of Kinto, and colleagues aimed to enhance the app by using AI to estimate informal caregivers' stress levels. High levels of informal caregiver burden, such as excessive physical strain or providing care for

more than 40 hours per week, are linked to elevated risk of preventable emergency department visits for care recipients.¹⁶ Chung's team fine-tuned a large language model (LLM)—a type of advanced NLP model that has been trained on vast amounts of text—to analyze in-app messages between care coaches and caregivers and assess caregiver strain and care recipient risk of emergency department visits. By leveraging AI analysis in support of person-to-person coaching, Kinto aimed to preserve personal connection and trust between care coaches and caregivers while augmenting care coaches' ability to prioritize cases based on need. Field testing during the pilot project found that AI-enhanced tools for caregiver strain assessment and resource recommendation were valuable additions to the coaching platform.

After completion of Kinto's pilot project, the startup was acquired by Rippl, a dementia-focused specialty care provider, enabling Kinto's LLM and care coaching to bolster the wide array of dementia support and care services offered through Rippl's dementia care model.¹⁷ In addition, Chung began to collaborate with Drs. Ipsit Vahia and Rachel Sava, who previously completed a project funded as a part of the first a2 Pilot Awards cohort. Through funding awarded to **McLean Hospital** and **Rippl** as a part of the third a2 Pilot Awards cohort, this collaboration conducted further testing of the LLM developed by Chung's team, evaluating its performance and developing ethical guidelines to inform the use of LLMs in dementia caregiver support. The research team demonstrated that the combination of a human geriatric care manager working with the LLM was significantly more effective in responding to caregiver questions than either the human or the LLM alone.

Building an integrated framework for enhanced caregiver support

These a2 Pilot Awards projects highlight the potential of AI-enabled technologies to augment traditional care systems that support informal caregivers. Collectively, they demonstrate how these technologies can help clinicians and coaches identify caregivers in need, understand the sources of caregiver burden, and deliver timely, targeted support. As the investigators leading these projects translate their AI-based innovations into real-world settings, they offer a promising path toward enhanced care frameworks that ensure caregivers' needs are recognized and addressed.

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The a2 Pilot Awards competition funds technology demonstration projects that use AI-based or emerging technology approaches to improve care, quality of life, and health outcomes for older adults, including those with dementia, and their caregivers. Combining nondilutive funding for early-stage technology development with guidance and resources provided by world-class academic research centers, the a2 Pilot Awards offer technologists from varied sectors and disciplines a unique environment to accelerate innovation that is grounded in scientific rigor. Visit a2collective.ai/awardees for more information about the a2 Collective's funded pilots.

This publication series aims to highlight both scientific and programmatic areas of need being addressed by members of the a2 Collective. These reports can be accessed at a2collective.ai/resources.

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