Transforming Community and Rural Healthcare with Health 4.0

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ABSTRACT

This study focuses on how changes in telehealth regulations, restrictions and normative behavior due to COVID-19 escalated the adoption of Health 4.0 principles in mental health care. The study zooms in on a rural state, Iowa and deconstructs the reality as the pandemic restrictions are lifted and providers as well as patients have more freedom to choose their preferred mode for receiving care. Results include: 1) increase in popularity for telehealth, especially among rural residents, 2) a significant drop in no-shows when making use of telehealth, 3) patients are primarily underwriting the expenses associated with access to telecommunications with some employer/industry investment. Public sector solution use is still small at this time, and 4) no notable drop in satisfaction. Methodology for this study focused primarily on behavioral pattern observation and findings suggest that further investment in telehealth to support patients in rural communities would be advised.

I. INTRODUCTION

In April 2020 telehealth landscape abruptly changed. The COVID-19 pandemic challenged society to reconsider the necessity of face-to-face interactions and replace as many as possible communication encounters with online alternatives. This was also true for counseling as mental health care providers. As Medicare, Medicaid and other health insurance providers flipped a switch to approve reimbursement, within days many providers made the nessisary adaptations to move encounters online in compliance with the new modality's HIPPA-compliant encrypted communication technology taking the form of phone as well as video conferencing.

This year long study deconstructs the landscape two years later as pandemic restrictions are practically removed and the World Health Organization (WHO) declares and end to the pandemic. Some health care providers opted to continue serving patients via telehealth, and some patients also opted to continue using telehealth modes. Most notably patients in Iowa's rural communities. Where 99% of residents have a mobile phone, and 24% have a laptop. 33% of Iowa's 3.2M residents live in rural communities compared to 20% of the US's 331.9 million resident (US Census, 2020).

II. GOALS

GOAL 1. ACCESS TO MENTAL HEALTH PROVIDERS
Mental health challenges are increasing, how can those who seek care receive care regardless of geographic limitations.

GOAL 2. DECREASE NO-SHOWS
The need for mental health care providers are increasing, how can the scheduled contact hours be put to best use.

GOAL 3. TECHNOLOGICAL BARRIERS OR ENVIRONMENT DISRUPTIONS
Rural communities' access to fiber and broadband is expanded but limited, what are the best solutions to assure quality in connection for a client encounter. This also includes awareness of how a change in controlled environment impacts safety and ability to talk freely.

GOAL 4. MANAGING SATISFACTION AND EXPECTATIONS
How to evaluate outcomes such as patient satisfaction when the medium and factors within medical providers' realm of control changes.

III. METHODOLOGY

- **Overview.** In one Iowa based sample, 2,409 individuals participated in counseling services from July 1, 2022 – June 30, 2023. 1,742 participants opted for in-person counseling, while 667 participants opted for telehealth counseling. Participants included a standard normal distribution of full range of gender identities, as well as life stages as starting as young as adolescent up through geriatric care stages (12-91 years old).
- **Medium.** Participants who made use of counseling services in-person visited a brick-and-mortar clinic environment. Participants using telemedicine used a HIPPA-compliant Zoom secure and encrypted software interface and a personal or institutionally provided mobile phone, tablet, laptop or desktop. phone, mobile device.
- **Frequency.** Both groups of participants included a standard normal distribution of patients making use of counseling services on a weekly, bi-weekly, monthly or as needed basis.
- **Methodology.** A chi-square analysis with 99% confidence was used to determine if there was a significant diffirence between no-show rates of the in-person vs telehealth participants.

IV. RESULTS

GOAL 1. ACCESS TO PROVIDERS INCREASED
COVID-19 pandemic accelerated the use of telemedicine as Medicare, Medicaid and other insurance providers started approving the use of telemedicine, including counseling. As the pandemic subsided, the high value, and low risk extended the post pandemic adaption, comfort and usage of telemedicine on a longer-term basis.

GOAL 2. NO SHOW RATES DROPPED
A chi-square test shows a statistical significance ($p < .0001$) between the no-show rates of in-person counseling vs telehealth counseling, with only 4 of a total of 667 telehealth appointments with no shows.

GOAL 3. TECHNOLOGICAL BARRIERS OR ENVIRONMENT DISRUPTIONS
When the participant did not make use of a clinic location, they connected from five different types of locations to ensure i) reliable internet connections and/or ii) confidential and safe environment for a private conversation.
a) Home
b) Car
c) Work
d) Senior nursing facility
d) School counselor's office
e) Local library

GOAL 4. MANAGING SATISFACTION AND EXPECTATIONS
Clinical impact was evaluated by open-ended, self-reported patient feedback categorized as: a) patient's expression of appreciation; 2) reason for referral e.g., anxiety addressed; 3) feedback on patient care.

V. DISCUSSION

If the objective is to better serve the needs of rural populations, the post pandemic landscape transformations signposts a few action items:

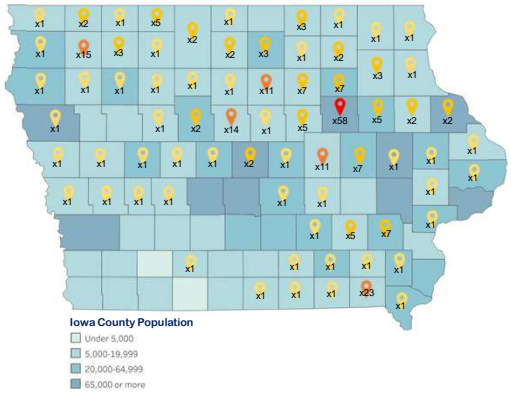
ACTION ITEM 1. INCREASING ACCESS
Medicare, Medicaide, and other insurance providers' approval of telemedicine claims will need to continue. Additionally, more providers will need to grow comfortable with the technology and unique procedures. Ultimately patients who are not getting help because they are unaware of the option will need to be informed of the option as providers.

ACTION ITEM 2. DECREASING NO SHOWS
Subsidizing transportation and mobile minutes is often used to proactively address no shows. By removing the transportation and time in transportation that disproportionately affect rural patients, this can significantly be decrease.

ACTION ITEM 3: DECREASING BARRIERS
At this time the majority of patients' households are personally subsidizing the connections and confidential meeting space. Employers/Industry and public sector could also proactively make resources available when underserved rural patients are too young, too old or financially vulnerable.

ACTION ITEM 4: MAINTAINING SATISFACTION
Behavioral metrics on making scheduled appointments are one rubric for evaluating satisfaction. Intentionality about creating a feedback loop and communicating alternative modes of therapy options is another.

Iowa rural county classification with unique telehealth patients
July 1, 2022 – June 30, 2023



What locations are rural telehealth patients using to connect from for their best confidentiality and reliability?

Underwriters of rural telehealth patients' communications technology?

VI. CONCLUSION

During the past year 73 out of 99 counties in Iowa, mostly with a rural county classification, were served with telehealth counseling. The majority users (66%) connected from home, but various collaborations with organizations in communities made it possible to reach wider to include other facilities in the community that have access to broadband internet.

To proactively lead the transformation of timely and quality access to underserved rural populations this study recommends aligning with a Health 4.0 framework for Iowa and beyond:

Health 1.0. Conventional: Building onto the tried and true models for providing mental health care, this medium requires patients and providers to have an awareness and understanding for how confidentiality and privacy can not be assumed in the home where an individual with authority and leverage may be listening in. Additionally in institutions a nurse or school councilor in an authority role may impact the dynamic of the patient-provider exchange.

Health 2.0. Technology. As the ubiquitous access to reliable and lower cost telecommunications technology increase, so may telehealth practices. However, many rural communities still use signals that may be impacted by weather, speeds my be throttled during high usage, and backup policies need to be in place for disconnection disruptions.

Health 3.0. Relationships. Deepening of relationship and connections may increase as a product of inquiring about artifacts in a personal space, pets, as well as the general comfort level of being home may have an impact on the relationship.

Health 4.0. Innovative. Future research and interventions need to focus beyond individual telehealth also on interpersonal and community programs. It will be beneficial to move from individual to also include interpersonal and relational systems, and beyond to ultimately include community health and wellness. Peer-to-peer facilitated coaching circles can scale in a way to address the need for more healthcare programs to extend beyond individual telehealth sessions.

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