



***Digital Inclusion to Prevent Drug Related Deaths:***  
***Literature review***

February 2022

**Interim Report to:**  
**Digital Lifelines Scotland**

**From:**  
**Drugs Research Network Scotland**

**Authors:**

Hadi Daneshvar, Hannah Carver, Catriona Matheson, Tessa Parkes, Joe Schofield, Graeme Strachan.

## 1. Introduction

Scotland is experiencing an ongoing public health crisis of drug-related deaths (DRD). In 2020, 1,339 DRD were recorded in Scotland, a 5% increase on 2019 figures and more than double the figure for 2008 (574) (National Records of Scotland, 2021). The Scottish DRD rate is more than three times that of the UK as a whole and is the highest in Europe. Three-quarters of DRD occur among people aged 35+ years. There is an ageing cohort of people who use drugs (PWUD) in Scotland and their vulnerability to DRD is exacerbated by the impact of many years of substance use, and often undiagnosed/poorly managed chronic health conditions e.g., Chronic Obstructive Pulmonary Disease (Matheson et al., 2019).

Barriers to care and support are created by the existing digital exclusion of people with multiple and complex needs. This has been highlighted and brought into particular focus by COVID-19 and the loss of much face-to-face support activity. This experience informed the development of the Digital Lifelines Scotland programme.

Digital Lifelines Scotland is a partnership initiative led by Technology Enabled Care Programme (Scottish Government Digital Health and Care Directorate) and Connecting Scotland (SG Digital Directorate) and is delivered in partnership with the Drugs Deaths Taskforce, Drug Research Network Scotland (DRNS), Scottish Council of Voluntary Organisations (SVCO) and Turning Point Scotland (TPS). It supports delivery of the priorities and recommendations of the Drug Deaths Taskforce, and of Overdose Detection and Responder Alert Technologies (ODART) programme.

Digital Lifelines Scotland has the following high-level aims:

By 2023, a range of digital solutions and re-designed services that meet the needs of people with multiple and complex needs at increased risk of drug-related harm are available and are being adopted. Specifically, that:

1. People have greater access to digital solutions that keep them safe and that enable them to become and remain connected to family, friends and relevant services that support them.
2. The services that support these citizens have the digital means to develop and strengthen the support they provide, and staff that are skilful in using and developing digital solutions to enable those they support.
3. The sector is digitally connected and collaborating, developing joined-up services, and exploring innovative solutions together.

## 2. Aim of the Review

We undertook a review of the international literature to identify what technologies have been used or have the potential to be adopted by PWUD, their reported benefits, views on the potential use of technologies, and evidence of their effectiveness. The review scoped and combined two broad concepts: 1) digital technologies and 2) people who use drugs.

The key areas of enquiry were:

- How have digital technologies been used to support people who use drugs or their family and carers?

- What services do digital technologies offer to PWUD? Where and when are these services available?
- What technology will work for whom and in what circumstances/settings/stages of treatment/recovery?
- What evidence (qualitative and quantitative) supports the application of digital technologies to reduce harm to people who use drugs?

We also considered the identification and description of key barriers that prevent PWUD from engaging with technology in harm reduction, treatment, and recovery services.

### 3. Methods

We describe the different approaches taken to the academic and grey literature with separate sections on methods below.

#### 3.1. Academic literature

We used the following working definition for a rapid review, “a rapid review is a type of knowledge synthesis in which components of the systematic review process are simplified or omitted to produce information in a short period of time” (Tricco et al., 2015, 02). As the project required a rapid overview of the literature to be reported to the Digital Lifelines Scotland programme group, we employed this approach to synthesising research and provide an overview of evidence (Wright and Bragge, 2018). Rapid reviews focus on already synthesised research evidence (if available) or on high-quality or recent primary studies (Khangura et al., 2012).

Other than sources of data (as described), the rapid review process is similar to a systematic review in establishing a systematic search strategy, setting inclusion and exclusion criteria for literature screening and selection, data extraction, and a synthesis of findings.

#### Search strategy

Based on the PICOS criteria (Methley et al., 2014)(**Error! Reference source not found.**), a search strategy was developed and executed using an electronic search. This includes the identification of search terms and inclusion and exclusion criteria. This review included primary qualitative and quantitative studies and reviews.

PICOS	Criteria for inclusion
Population	People who use/d drugs; their families and supporters
Intervention	Use of digital technologies
Comparison	Non-use of technology for services
Outcome	Uses and effectiveness of use; barriers to non-use
Study design	Synthesised research evidence (if available) or high-quality or recent primary studies (using any methods)

*Table 1- Inclusion Criteria Using PICOS Tool*

We searched five academic databases (MEDLINE, PubMed, Scopus, PsycINFO, and The Cochrane Database of Systematic Reviews) for articles published between January 2010 and August 2021. Additionally, we searched the citations of included papers for additional eligible papers. Search terms used were specifically related to drugs and digital inclusion/exclusion (See Table 2).

We searched for all peer-reviewed studies published in English in international journals. This included all reviewed literature (qualitative and quantitative) comprising of review papers

(systematic/narrative etc.) and empirical studies (including published conference papers). Grey literature was also included.

Subject	Search terms
Population	<p>“Drug* misuse*” OR “Drug* overdose” OR “Drug* substance*” OR substance* OR polydrug OR "poly-drug" OR "legal high*" OR psychoactive* OR "psycho-active*" OR psychotropic* OR ketamine OR speed OR spice OR cocaine OR crack OR "laughing gas" OR benzodiazepine* OR tranquiliser* OR tranquilizer* OR opioid* OR opiate*OR hallucinogen* OR gabapentin OR pregabalin OR etizolam OR valium OR Cannab* OR marijuana OR skunk OR amphetamine* OR amfetamin* OR meth OR methamphetamine OR methamfetamin* OR heroin OR poppers OR "amyl nitrate" OR "butyl nitrate" OR "new psychoactive drug*" OR "novel psychoactive drug*" OR "novel psychoactive substance*" OR NPS</p>
Intervention	<p>“digital inclusion” OR “digital exclusion” OR “digital society” OR “digital participation” OR “digital literacy” OR “digital world” OR “digital capability” OR “digital entertainment” OR “digital divide” OR “exclusion technolog*” OR “information communication technolog*” OR ICT OR “information technolog*” OR “online world” OR “e-health” OR eHealth OR “electronic health” OR “m-health” OR mHealth OR “mobile health” OR “tele-health” OR “tele-care” OR telehealth OR telecare</p>

Table 2 - Search terms used

We excluded protocols, conference abstracts, clinical trial registry, in progress studies, frameworks with no empirical data, and opinion-based articles or commentaries. Also, any studies deploying a non-digital intervention only and alcohol/tobacco/prescription medication use only were excluded. Relevant databases and search terms were identified with the help of the University of Stirling’s librarian.

### **Data management and synthesis**

Titles and abstracts were screened to identify relevant papers that met the inclusion criteria by a researcher (HD). Rayyan (an online systematic review tool) was used for the reviewing process. In cases where there was uncertainty regarding whether the papers met the inclusion criteria, HD marked these as ‘maybe’ and these were reviewed by JS, who made a decision regarding whether or not to include them.

Two researchers (HC and JS) independently checked a random selection of 20% of titles and abstracts. If there were disagreements/uncertainties regarding inclusion of any papers, they were checked by a third reviewer (TP).

Full articles were then retrieved, read and key data were extracted (e.g. title, authors, publication year, country, intervention type, focus, methods, participants, abstract and journal title) and entered into an Excel spreadsheet. Once data extraction was complete, all papers were categorised (by HD) into the nine topics recommended as areas for the Digital Lifelines programme, which were identified within an earlier report by Matheson et al. (2022) on user needs (Appendix 1). The papers which did not fall into these nine categories were labelled as ‘other’. The recommendations and associated categories (in bold) are:

1. Provision of smartphones and data packages is required for those who do not have them (**Access to smartphone and data packages**);
2. Access to computers, laptops and tablets to complement phone use, and facilitate more complicated online tasks is required. This could be via household provision, service-based, or another hub such as a community group (**Provision of other digital technology e.g. computers, laptops and tablets**);
3. Device provision should be supported by appropriate and tailored skills training (**Provision of support and skills training**);
4. Services providing access public/hubs/internet cafes to support people with skills development generally but also to support practical use e.g., completion of online forms for specific purposes (**Improved access to the public Internet**);
5. Innovative skills training involving or led by PWUD should be developed (**Innovative skills training**);
6. Website or software applications on local service availability should be developed (**Development of local software applications**);
7. Online chat (webchat) opportunities/functions in services or community groups should be developed (**Development of digital services**);
8. Harm reduction information apps should be developed (**Development of harm reduction information apps**);
9. Overdose prevention technology including wearables and apps should be developed (**Development of overdose prevention technology**).

As noted above, an additional 'other' category was created and the range of literature in this category is being reviewed for consideration within the Digital Lifelines Scotland programme.

### 3.2. Grey literature

Non-academic literature (grey literature) was identified by searching the websites of a range of relevant organisations. A list of 74 relevant international organisations was created. Websites were searched in October and November 2021 by GS using key words of 'digital' and 'drug use' (where searches were possible). Relevant reports (research and other) were identified from 31 international organisations. For the purpose of this report, TP examined the list and identified several potentially relevant reports for extraction. GS then read each report and extracted key information in the form of authors, date, country, title of the report, a short summary of the report and the URL. These were entered into a table (see Appendix 2) and were then categorised by relevance to PWUD: those in green were specifically related to digital inclusion/exclusion for PWUD; those in yellow were relevant but not specific to PWUD (i.e., about people experiencing homelessness); and those in red are somewhat relevant but are more general.

## 4. Results

The study selection process is presented in a PRISMA diagram in Figure 1. A total of 5,304 papers were identified from the databases. 2,098 papers duplicates were removed. After screening the titles and abstracts of papers, 3,130 were removed as they did not meet the inclusion criteria. The full texts of 76 papers were scanned and reviewed. A further eight papers were removed during this process, leaving a total of 68 papers.

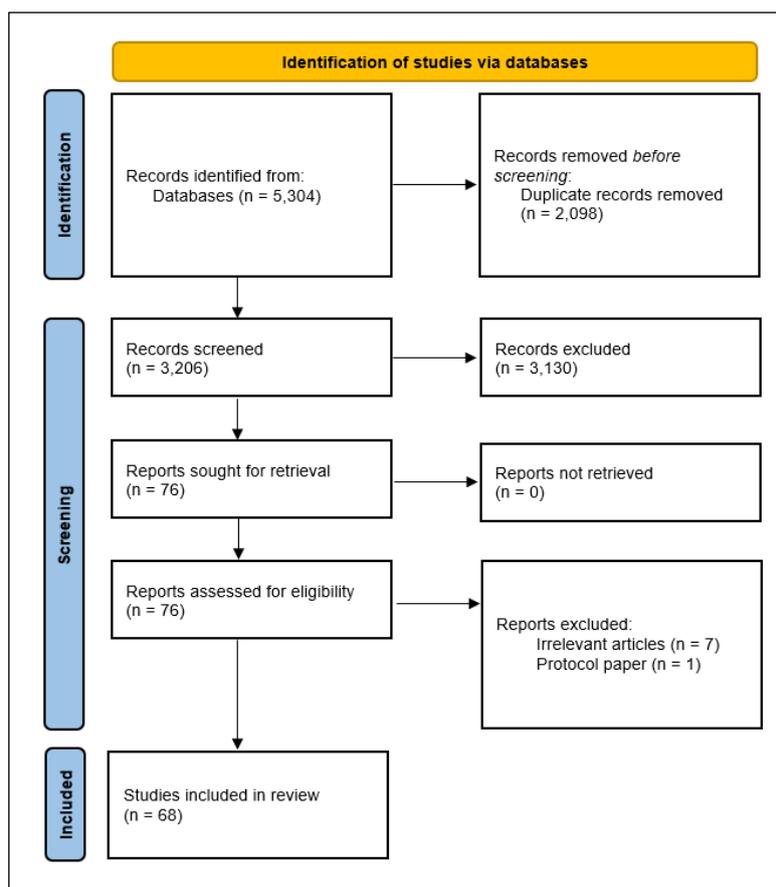


Figure 1- PRISMA flow diagram

## 5. Summary of key findings

In this section, we provide an initial high-level analysis of the literature on digital technology for PWUD. A total of 68 papers are included and will be summarised below; full details are provided in Appendix 1. One-third (35%) of papers were literature reviews, while the remaining papers were empirical studies. Sixteen per cent of studies used qualitative methods for collecting data, while the rest of used a quantitative approach. Most of the studies (74%) were conducted in the United States, and the remaining 26% were conducted in the UK, Canada, Ireland, India, Greece, France, and by other international teams.

It is notable that three-quarters of the papers (75%, 51 papers) identified in the academic literature were published after 2019. This indicates that the COVID-19 pandemic has had a significant impact on the publication of papers in this field. This could possibly be due to the fact that a large number of organisations around the world had moved away from traditional models of provision of service to offer their services through digital technology indicating the important role this now has. Many study authors observed how these technologies could change the way existing services were provided or had led to the offering of new digital services. When we compare the studies published before and after the pandemic, we observe the accelerated implementation and use of digital technologies as a result of services having to move online or use digital technology. However, overall, the number of studies published specifically on digital inclusion or the needs of PWUD was limited.

The largest category of empirical studies (24 papers) were on the topic of telehealth. These papers evaluated and researched the effectiveness of the telephone and video intervention used for service

provision to patients and PWUD. These papers explored how services and service provision were changed from physical and in-person to remote digital services. Different topics were examined such as the treatment of patients through the use of phone or video call, recovery services, therapeutic services, support services and training. Other studies compared the telehealth service versus physical services.

Another strong theme within the retrieved literature (16 papers) was mHealth (mobile health) which refers to the use of smartphones, applications, and the Internet for providing services to PWUD. These papers discussed the uses of mHealth, its effectiveness, or the evaluation of applications developed in this field. Several aspects of mHealth evaluated by different papers were the use of mobile applications for treatment, behavioural treatments, recovery, and the social aspect of using applications. A number of studies explored different functionalities of developed applications. Other papers investigated smartphone applications developed in the market and evaluated them. Some studies investigated mobile phone and internet use by different groups of PWUD. Prescription monitoring and service were other topics of investigation in this field.

A number of papers (n= 15) focussed on what they described as eHealth (electronic health) services which covered a broader area of digital technology. These studies focused on different topics such as treatments, behaviours, and recovery services. Various aspects of digital technology such as software for assessing risk, assessing the use of technology, and the use of technology by PWUD, were topics discussed by these studies.

Four papers presented recently published studies on sensors and wearable devices. These papers presented different uses of wearables and sensors-based apps such as stress and craving, overdose detection and treatment, and substance use status of PWUD.

Additionally, 24 sources were identified (Appendix 2) from the review of grey literature. These sources provided relevant contextual information for high-risk groups but only one publication was directly relevant to PWUD. This source focused on mHealth applications for responding to drug use and related harm. Other relevant papers focused on the provision of digital technology, improving access to digital health, and supporting digital skills for people experiencing homelessness. Somewhat relevant sources focused on the use of technology for older and disabled adults; digital inclusion among people accessing Citizens Advice services; factors influencing access to digital technology; digital technology for children and young people; digital inclusion for health and social care; digital work for lesbian, gay, bisexual and trans (LGBT) young people; and other factors relating to digital inclusion/exclusion.

## **6. Next Steps**

Empirical papers will be reviewed in more detail for information on effectiveness to reduce harm for PWUD and consideration of what technology will work for whom and in what circumstances/settings/stages of treatment/recovery. Topics for inclusion in the Digital Lifelines programme which have not been previously identified in the user needs analysis will be identified for further consideration.

## 7. References

- ALBERTELLA, L., GIBSON, L., ROOKE, S., NORBERG, M. M. & COPELAND, J. 2019. A smartphone app intervention for adult cannabis users wanting to quit or reduce their use: a pilot evaluation. *J Cannabis Res*, 1, 9.
- ANVARI, M. S., SEITZ-BROWN, C. J., SPENCER, J., MULHERON, M., ABDELWAHAB, S., BORBA, C. P. C., MAGIDSON, J. F. & FELTON, J. W. 2021. "How can I hug someone now [over the phone]?": Impacts of COVID-19 on peer recovery specialists and clients in substance use treatment. *Journal of substance abuse treatment*, 108649.
- ASHFORD, R. D., GIORGI, S., MANN, B., PESCE, C., SHERRITT, L., UNGAR, L. & CURTIS, B. 2020. Digital recovery networks: Characterizing user participation, engagement, and outcomes of a novel recovery social network smartphone application. *J Subst Abuse Treat*, 109, 50-55.
- ASHFORD, R. D., LYNCH, K. & CURTIS, B. 2018. Technology and Social Media Use Among Patients Enrolled in Outpatient Addiction Treatment Programs: Cross-Sectional Survey Study. *J Med Internet Res*, 20, e84.
- BAHADOOR, R., ALEXANDRE, J. M., FOURNET, L., GELLÉ, T., SERRE, F. & AURIACOMBE, M. 2021. Inventory and Analysis of Controlled Trials of Mobile Phone Applications Targeting Substance Use Disorders: A Systematic Review. *Front Psychiatry*, 12, 622394.
- BALDACCHINO, A., CROCAMO, C., HUMPHRIS, G., NEUFEIND, J., FRISHER, M., SCHERBAUM, N. & CARRÀ, G. 2016. Decision support in addiction: The development of an e-health tool to assess and prevent risk of fatal overdose. The ORION Project. *Computer methods and programs in biomedicine*, 133, 207-216.
- BENAVIDES-VAELLO, S., STRODE, A. & SHEERAN, B. C. 2013. Using technology in the delivery of mental health and substance abuse treatment in rural communities: a review. *The journal of behavioral health services & research*, 40, 111-120.
- BERGMAN, B. G. & KELLY, J. F. 2021. Online digital recovery support services: An overview of the science and their potential to help individuals with substance use disorder during COVID-19 and beyond. *J Subst Abuse Treat*, 120, 108152.
- BONAR, E. E., KOOCHER, G. P., BENOIT, M. F., COLLINS, R. L., CRANFORD, J. A. & WALTON, M. A. 2018. Perceived Risks and Benefits in a Text Message Study of Substance Abuse and Sexual Behavior. *Ethics & behavior*, 28, 218-234.
- BOUMPARIS, N., LOHEIDE-NIESMANN, L., BLANKERS, M., EBERT, D. D., KORF, D., SCHAUB, M. P., SPIJKERMAN, R., TAIT, R. J. & RIPER, H. 2019. Short- and long-term effects of digital prevention and treatment interventions for cannabis use reduction: A systematic review and meta-analysis. *Drug Alcohol Depend*, 200, 82-94.
- CANTOR, J. & LAURITO, A. 2021. The new services that opioid treatment programs have adopted in response to COVID-19. *Journal of substance abuse treatment*, 130, 108393.
- CANTOR, J., MCBAIN, R. K., KOFNER, A., HANSON, R., STEIN, B. D. & YU, H. 2021. Telehealth Adoption by Mental Health and Substance Use Disorder Treatment Facilities in the COVID-19 Pandemic. *Psychiatric services (Washington, D.C.)*, appips202100191.
- CARRÀ, G., CROCAMO, C., HUMPHRIS, G., TABACCHI, T., BARTOLI, F., NEUFEIND, J., SCHERBAUM, N. & BALDACCHINO, A. 2017. Engagement in the Overdose Risk Information (ORION) e-Health Tool for Opioid Overdose Prevention and Self-Efficacy: A Preliminary Study. *Cyberpsychology, behavior and social networking*, 20, 762-768.
- CARREIRO, S., CHAI, P. R., CAREY, J., LAI, J., SMELSON, D. & BOYER, E. W. 2018. mHealth for the Detection and Intervention in Adolescent and Young Adult Substance Use Disorder. *Current addiction reports*, 5, 110-119.
- CARREIRO, S., TAYLOR, M., SHRESTHA, S., REINHARDT, M., GILBERTSON, N. & INDIC, P. 2021. Realize, Analyze, Engage (RAE): A Digital Tool to Support Recovery from Substance Use Disorder. *Journal of psychiatry and brain science*, 6.
- CAULFIELD, C. P. 2021. Using Telecare to Treat Opioid Use Disorder: An Ethnographic Study in New York During COVID-19. *Contemporary Drug Problems*.

- COLLINS, K. M., ARMENTA, R. F., CUEVAS-MOTA, J., LIU, L., STRATHDEE, S. A. & GARFEIN, R. S. 2016. Factors associated with patterns of mobile technology use among persons who inject drugs. *Substance abuse*, 37, 606-612.
- CORDOVA, D., MUNOZ-VELAZQUEZ, J., MENDOZA LUA, F., FESSLER, K., WARNER, S., DELVA, J., ADELMAN, N., FERNANDEZ, A. & BAUERMEISTER, J. 2020. Pilot Study of a Multilevel Mobile Health App for Substance Use, Sexual Risk Behaviors, and Testing for Sexually Transmitted Infections and HIV Among Youth: randomized Controlled Trial. *JMIR mhealth and uhealth*, 8, e16251.
- COULTER, K. J. & HINTZSCHE, M. F. 2020. Establishing a Telehealth Program in Primary Care for the Treatment of Opioid Use Disorder. *Journal of doctoral nursing practice*, 13, 207-215.
- CURTIS, B. L., ASHFORD, R. D., MAGNUSON, K. I. & RYAN-PETTES, S. R. 2019. Comparison of Smartphone Ownership, Social Media Use, and Willingness to Use Digital Interventions Between Generation Z and Millennials in the Treatment of Substance Use: Cross-Sectional Questionnaire Study. *J Med Internet Res*, 21, e13050.
- DICK, S., WHELAN, E., DAVOREN, M. P., DOCKRAY, S., HEAVIN, C., LINEHAN, C. & BYRNE, M. 2019. A systematic review of the effectiveness of digital interventions for illicit substance misuse harm reduction in third-level students. *BMC public health*, 19, 1244.
- DUGDALE, S., ELISON-DAVIES, S., SEMPER, H., WARD, J. & DAVIES, G. 2019. Are Computer-Based Treatment Programs Effective at Reducing Symptoms of Substance Misuse and Mental Health Difficulties Within Adults? A Systematic Review. *Journal of dual diagnosis*, 15, 291-311.
- ESTRADA, Y., LEE, T. K., WAGSTAFF, R., M ROJAS, L., TAPIA, M. I., VELÁZQUEZ, M. R., SARDINAS, K., PANTIN, H., SUTTON, M. Y. & PRADO, G. 2019. eHealth Familias Unidas: Efficacy Trial of an Evidence-Based Intervention Adapted for Use on the Internet with Hispanic Families. *Prevention science : the official journal of the Society for Prevention Research*, 20, 68-77.
- FROST, J. H. & MASSAGLI, M. P. 2008. Social Uses of Personal Health Information Within PatientsLikeMe, an Online Patient Community: What Can Happen When Patients Have Access to One Another's Data. *Journal of Medical Internet Research*, 10.
- GANESH, R., RAO, R., DEB, K. S., BHAD, R. & YADAV, D. 2021. Digital Capacity and Interest in mHealth Interventions Among Individuals on Opioid Agonist Maintenance Treatment: A Cross-Sectional Community-Based Study. *Indian Journal of Psychological Medicine*.
- GENZ, A., KIRK, G., PIGGOTT, D., MEHTA, S. H., LINAS, B. S. & WESTERGAARD, R. P. 2015. Uptake and Acceptability of Information and Communication Technology in a Community-Based Cohort of People Who Inject Drugs: Implications for Mobile Health Interventions. *JMIR Mhealth Uhealth*, 3, e70.
- GODERSKY, M. E., KLEIN, J. W., MERRILL, J. O., BLALOCK, K. L., SAXON, A. J., SAMET, J. H. & TSUI, J. I. 2020. Acceptability and Feasibility of a Mobile Health Application for Video Directly Observed Therapy of Buprenorphine for Opioid Use Disorders in an Office-based Setting. *Journal of addiction medicine*, 14, 319-325.
- GOLDFINE, C., LAI, J. T., LUCEY, E., NEWCOMB, M. & CARREIRO, S. 2020. Wearable and Wireless mHealth Technologies for Substance Use Disorder. *Current addiction reports*, 7, 291-300.
- GUILLEN, A. G., REDDY, M., SAADAT, S. & CHAKRAVARTHY, B. 2021. Utilization of Telehealth Solutions for Patients with Opioid Use Disorder Using Buprenorphine: A Scoping Review. *Telemedicine journal and e-health : the official journal of the American Telemedicine Association*.
- HENRETTY, K., PADWA, H., TREIMAN, K., GILBERT, M. & MARK, T. L. 2021. Impact of the Coronavirus Pandemic on Substance Use Disorder Treatment: Findings from a Survey of Specialty Providers in California. *Substance abuse : research and treatment*, 15, 11782218211028655.
- HUSSEY, D. & FLYNN, K. C. 2019. The utility and impact of the addiction comprehensive health enhancement support system (ACHES) on substance abuse treatment adherence among youth in an intensive outpatient program. *Psychiatry Res*, 281, 112580.

- JENSEN, A. N., BEAM, C. M., DOUGLASS, A. R., BRABSON, J. E., COLVARD, M. & BEAN, J. 2019. Description of a pharmacist-led clinical video telehealth group clinic for opioid overdose prevention and naloxone education. *The mental health clinician*, 9, 294-297.
- KAZEMI, D. M., BORSARI, B., LEVINE, M. J., LI, S., LAMBERSON, K. A. & MATTA, L. A. 2017. A Systematic Review of the mHealth Interventions to Prevent Alcohol and Substance Abuse. *Journal of health communication*, 22, 413-432.
- KAZEMI, D. M., TROUTMAN-JORDAN, M., WHITFIELD, J. E. & PAPPA, E. V. 2021. Effectiveness of eHealth Technology-Based Interventions in Reducing Substance Misuse Among Older Adults: A Systematic Review. *Journal of gerontological nursing*, 47, 23-29.
- KEDIA, S. K., SCHMIDT, M., DILLON, P. J., ARSHAD, H. & YU, X. 2021. Substance use treatment in Appalachian Tennessee amid COVID-19: Challenges and preparing for the future. *Journal of substance abuse treatment*, 124, 108270.
- KERSHAW, S., BIRRELL, L., DEEN, H., NEWTON, N. C., STAPINSKI, L. A., CHAMPION, K. E., KAY-LAMBKIN, F., TEESSON, M. & CHAPMAN, C. 2021. Evaluation of a Digital Health Initiative in Illicit Substance Use: Cross-sectional Survey Study. *Journal of medical Internet research*, 23, e29026.
- KHANGURA, S., KONNYU, K., CUSHMAN, R., GRIMSHAW, J. & MOHER, D. 2012. Evidence summaries: the evolution of a rapid review approach. *Systematic reviews*, 1, 1-9.
- KIM, S. H. & TESMER, O. 2021. Employing telehealth strategies for opioid addiction during COVID-19: implications for social work health care. *Soc Work Health Care*, 60, 499-508.
- LANGDON, K. J., SCHERZER, C., RAMSEY, S., CAREY, K., RICH, J. & RANNEY, M. L. 2021. Feasibility and acceptability of a digital health intervention to promote engagement in and adherence to medication for opioid use disorder. *J Subst Abuse Treat*, 108538.
- LAUVSNES, A. D. F., LANGAAS, M., TOUSSAINT, P. & GRÅWE, R. W. 2020. Mobile Sensing in Substance Use Research: A Scoping Review. *Telemed J E Health*, 26, 1191-1196.
- LEGHA, R. K., MOORE, L., LING, R., NOVINS, D. & SHORE, J. 2020. Telepsychiatry in an Alaska Native Residential Substance Abuse Treatment Program. *Telemed J E Health*, 26, 905-911.
- LIN, L. A., CASTEEL, D., SHIGEKAWA, E., WEYRICH, M. S., ROBY, D. H. & MCMENAMIN, S. B. 2019. Telemedicine-delivered treatment interventions for substance use disorders: A systematic review. *J Subst Abuse Treat*, 101, 38-49.
- LINAS, B. S., LATKIN, C., GENZ, A., WESTERGAARD, R. P., CHANG, L. W., BOLLINGER, R. C. & KIRK, G. D. 2015a. Utilizing mHealth methods to identify patterns of high risk illicit drug use. *Drug and alcohol dependence*, 151, 250-257.
- LINAS, B. S., LATKIN, C., WESTERGAARD, R. P., CHANG, L. W., BOLLINGER, R. C., GENZ, A. & KIRK, G. D. 2015b. Capturing illicit drug use where and when it happens: an ecological momentary assessment of the social, physical and activity environment of using versus craving illicit drugs. *Addiction (Abingdon, England)*, 110, 315-325.
- MARES, M. L., GUSTAFSON, D. H., GLASS, J. E., QUANBECK, A., MCDOWELL, H., MCTAVISH, F., ATWOOD, A. K., MARSCH, L. A., THOMAS, C., SHAH, D., BROWN, R., ISHAM, A., NEALON, M. J. & WARD, V. 2016. Implementing an mHealth system for substance use disorders in primary care: a mixed methods study of clinicians' initial expectations and first year experiences. *BMC Med Inform Decis Mak*, 16, 126.
- MARK, T. L., TREIMAN, K., PADWA, H., HENRETTY, K., TZENG, J. & GILBERT, M. 2021. Addiction Treatment and Telehealth: Review of Efficacy and Provider Insights During the COVID-19 Pandemic. *Psychiatric services (Washington, D.C.)*, appis202100088.
- MATHESON, C., CARVER, H., PARKES, T., DANESHVAR, H., SCHOFIELD, J., DUMBRELL, J., CONNELL, C., PRICE, T. & HNIZDILOVA, K. 2022. Digital Inclusion to Prevent Drug Related Deaths: Scoping user needs. Scotland: Drugs Research Network Scotland.
- MATHESON, C., HAMILTON, E., WALLACE, J. & LIDDELL, D. 2019. Exploring the health and social care needs of older people with a drug problem. *Drugs: Education, Prevention and Policy*, 26, 493-501.

- MCCLURE, E. A., ACQUAVITA, S. P., HARDING, E. & STITZER, M. L. 2013. Utilization of communication technology by patients enrolled in substance abuse treatment. *Drug and alcohol dependence*, 129, 145-150.
- MEHTANI, N. J., RISTAU, J. T., SNYDER, H., SURLYN, C., EVELAND, J., SMITH-BERNARDIN, S. & KNIGHT, K. R. 2021. COVID-19: A catalyst for change in telehealth service delivery for opioid use disorder management. *Substance abuse*, 42, 205-212.
- METHLEY, A. M., CAMPBELL, S., CHEW-GRAHAM, C., MCNALLY, R. & CHERAGHI-SOHI, S. 2014. PICO, PICOS and SPIDER: a comparison study of specificity and sensitivity in three search tools for qualitative systematic reviews. *BMC health services research*, 14, 1-10.
- MILWARD, J., DAY, E., WADSWORTH, E., STRANG, J. & LYNKEY, M. 2015. Mobile phone ownership, usage and readiness to use by patients in drug treatment. *Drug Alcohol Depend*, 146, 111-5.
- MIMIGIANNIS, C., GALLOS, P. & MANTAS, J. 2020. The Drug Addicts' Usage of Information and Communication Technologies. *Studies in health technology and informatics*, 275, 236-237.
- MOLFENTER, T., ROGET, N., CHAPLE, M., BEHLMAN, S., CODY, O., HARTZLER, B., JOHNSON, E., NICHOLS, M., STILEN, P. & BECKER, S. 2021. Use of Telehealth in Substance Use Disorder Services During and After COVID-19: Online Survey Study. *JMIR mental health*, 8, e25835.
- MUMBA, M. N., JAISWAL, J., LANGNER-SMITH, N., MUGOYA, G. T., BROWN, W. & DAVIS, L. L. 2021. COVID-19 and opioid use disorder: Expanding treatment access in rural settings. *Nursing*, 51, 44-47.
- NATIONAL RECORDS OF SCOTLAND 2021. Drug-related Deaths in Scotland in 2020.
- NEALE, J. & STEVENSON, C. 2014. Homeless drug users and information technology: A qualitative study with potential implications for recovery from drug dependence. *Substance Use and Misuse*, 49, 1465-1472.
- NUAMAH, J., MEHTA, R. & SASANGO HAR, F. 2020. Technologies for Opioid Use Disorder Management: Mobile App Search and Scoping Review. *JMIR mHealth and uHealth*, 8, e15752.
- OESTERLE, T. S., KOLLA, B., RISMA, C. J., BREITINGER, S. A., RAKOCEVIC, D. B., LOUKIANOVA, L. L., HALL-FLAVIN, D. K., GENTRY, M. T., RUMMANS, T. A., CHAUHAN, M. & GOLD, M. S. 2020. Substance Use Disorders and Telehealth in the COVID-19 Pandemic Era: A New Outlook. *Mayo Clinic proceedings*, 95, 2709-2718.
- OZGA, J. E., PAQUETTE, C., SYVERTSEN, J. L. & POLLINI, R. A. 2021. Mobile phone and internet use among people who inject drugs: Implications for mobile health interventions. *Substance abuse*, 1-6.
- PAGANO, A., HOSAKOTE, S., KAPITENI, K., STRAUS, E. R., WONG, J. & GUYDISH, J. R. 2021. Impacts of COVID-19 on residential treatment programs for substance use disorder. *Journal of substance abuse treatment*, 123, 108255.
- PRADHAN, A. M., PARK, L., SHAYA, F. T. & FINKELSTEIN, J. 2019. Consumer Health Information Technology in the Prevention of Substance Abuse: Scoping Review. *Journal of medical Internet research*, 21, e11297.
- QUAGLIO, G., PIRONA, A., ESPOSITO, G., KARAPIPERIS, T., BRAND, H., DOM, G., BERTINATO, L., MONTANARI, L., KIEFER, F. & CARRÀ, G. 2019. Knowledge and utilization of technology-based interventions for substance use disorders: An exploratory study among health professionals in the European Union. *Drugs: Education, Prevention & Policy*, 26, 437-446.
- RYAN-PETTES, S. R., LANGE, L. L. & MAGNUSON, K. I. 2019. Mobile Phone Access and Preference for Technology-Assisted Aftercare Among Low-Income Caregivers of Teens Enrolled in Outpatient Substance Use Treatment: Questionnaire Study. *JMIR mHealth and uHealth*, 7, e12407.
- SANTA ANA, E. J., STALLINGS, D. L., ROUNSAVILLE, B. J. & MARTINO, S. 2013. Development of an in-home telehealth program for outpatient veterans with substance use disorders. *Psychological services*, 10, 304-314.

- SHAMS, F., WONG, J. S. H., NIKOO, M., OUTADI, A., MOAZEN-ZADEH, E., KAMEL, M. M., SONG, M. J., JANG, K. L. & KRAUSZ, R. M. 2021. Understanding eHealth Cognitive Behavioral Therapy Targeting Substance Use: Realist Review. *Journal of medical Internet research*, 23, e20557.
- SILANG, K., SANGUINO, H., SOHAL, P. R., RIOUX, C., KIM, H. S. & TOMFOHR-MADSEN, L. M. 2021. eHealth Interventions to Treat Substance Use in Pregnancy: A Systematic Review and Meta-Analysis. *International journal of environmental research and public health*, 18.
- SUGARMAN, D. E., BUSCH, A. B., MCHUGH, R. K., BOGUNOVIC, O. J., TRINH, C. D., WEISS, R. D. & GREENFIELD, S. F. 2021. Patients' perceptions of telehealth services for outpatient treatment of substance use disorders during the COVID-19 pandemic. *The American journal on addictions*, 30, 445-452.
- THOMPSON, T. A., AHRENS, K. A. & COPLON, L. 2020. Virtually possible: using telehealth to bring reproductive health care to women with opioid use disorder in rural Maine. *Mhealth*, 6, 41.
- TOFIGHI, B., CHEMI, C., RUIZ-VALCARCEL, J., HEIN, P. & HU, L. 2019. Smartphone Apps Targeting Alcohol and Illicit Substance Use: Systematic Search in in Commercial App Stores and Critical Content Analysis. *JMIR Mhealth Uhealth*, 7, e11831.
- TRICCO, A. C., ANTONY, J., ZARIN, W., STRIFLER, L., GHASSEMI, M., IVORY, J., PERRIER, L., HUTTON, B., MOHER, D. & STRAUS, S. E. 2015. A scoping review of rapid review methods. *BMC medicine*, 13, 1-15.
- USCHER-PINES, L., RAJA, P., MEHROTRA, A. & HUSKAMP, H. A. 2020. Health center implementation of telemedicine for opioid use disorders: A qualitative assessment of adopters and nonadopters. *J Subst Abuse Treat*, 115, 108037.
- VILARDAGA, R., FISHER, T., PALENSKI, P. E., KUMARESAN, V., MANNELLI, P., SWEITZER, M. M., MCCLERNON, F. J., ENGELHARD, M. M., SABO, P. L. & GARRISON, K. A. 2020. Review of Popularity and Quality Standards of Opioid-Related Smartphone Apps. *Curr Addict Rep*, 7, 486-496.
- WANG, L. X. 2021. The complementarity of drug monitoring programs and health IT for reducing opioid-related mortality and morbidity. *Health economics*, 30, 2026-2046.
- WRIGHT, B. & BRAGGE, P. 2018. Interventions to promote healthy eating choices when dining out: A systematic review of reviews. *British journal of health psychology*, 23, 278-295.

## Appendix 1. Peer-reviewed literature summary

Title	Y. <sup>1</sup>	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J. <sup>2</sup>
<b>1. Access to smartphone and data packages</b>									
Factors associated with patterns of mobile technology use among persons who inject drugs	2016	Collins, K. et al.	Mobile Technology Use (MTU) for PWID	To identify patterns of Mobile Technology Use (MTU) and identified factors associated with MTU among a cohort of PWID. Data were collected through a longitudinal cohort study examining drug use, risk behaviours, and health status among PWID.	US	Quantitative (surveys)	People who inject drugs (n=461)	Background: New and innovative methods of delivering interventions are needed to further reduce risky behaviours and increase overall health among persons who inject drugs (PWID). Mobile health (mHealth) interventions have potential for reaching PWID; however, little is known about mobile technology use (MTU) in this population. In this study, the authors identify patterns of MTU and identified factors associated with MTU among a cohort of PWID. Methods: Data were collected through a longitudinal cohort study examining drug use, risk behaviours, and health status among PWID in San Diego, California. Latent class analysis (LCA) was used to define patterns of MTU (i.e., making voice calls, text messaging, and mobile Internet access). Multinomial logistic regression was then used to identify demographic characteristics, risk behaviours, and health indicators associated with mobile technology use class. Results: In LCA, a 4-class solution fit the data best. Class 1 was defined by low MTU (22%, n D 100); class 2, by PWID who accessed the Internet using a mobile device but did not use voice or text messaging (20%, n D 95); class 3, by primarily voice, text, and connected Internet use (17%, n D 91); and class 4, by high MTU (41%, n D 175). Compared with low MTU, high MTU class members were more likely to be younger, have higher socioeconomic status, sell drugs, and inject methamphetamine daily. <u>Conclusion: The majority of PWID in San Diego use mobile technology for voice, text, and/or Internet access, indicating that rapid uptake of mHealth interventions may be possible in this population. However, low ownership and use of mobile technology among older and/or homeless individuals will need to be considered when implementing mHealth interventions among PWID.</u>	Substance Abuse
Uptake and acceptability of information and communication technology in a community-based cohort of people who inject drugs: implications for mobile health interventions	2015	Genz, A. et al.	Mobile phones use for the health information for people who inject drugs	To understand patterns of mobile phone ownership, Internet use and willingness to receive health information via mobile devices among people who inject drugs. We surveyed current and former drug injectors participating in a longitudinal cohort study.	US	Quantitative (survey)	People who inject drugs (n=845)	Background: Mobile phone and Internet-based technologies are increasingly used to disseminate health information and facilitate delivery of medical care. While these strategies hold promise for reducing barriers to care for medically-underserved populations, their acceptability among marginalized populations such as people who inject drugs is not well-understood. Objective: To understand patterns of mobile phone ownership, Internet use and willingness to receive health information via mobile devices among people who inject drugs. Methods: We surveyed current and former drug injectors participating in a longitudinal cohort study in Baltimore, Maryland, USA. Respondents completed a 12-item, interviewer-administered questionnaire during a regular semi-annual study visit that assessed their use of mobile technology and preferred modalities of receiving health information. Using data from the parent study, we used logistic regression to evaluate associations among participants' demographic and clinical characteristics and their mobile phone and Internet use. Results: The survey was completed by 845 individuals, who had a median age of 51 years. The sample was 89% African-American, 65% male, and 33% HIV-positive. Participants were generally of low education and income levels. Fewer than half of respondents (40%) indicated they had ever used the Internet. Mobile phones were used by 86% of respondents. Among mobile phone owners, 46% had used their phone for text messaging and 25% had accessed the Internet on their phone. A minority of respondents (42%) indicated they would be interested in receiving health information via phone or Internet. Of those receptive to receiving health information, a mobile phone call was the most favoured modality (66%) followed by text messaging (58%) and Internet (51%). <u>Conclusions: Utilisation of information and communication technology among this cohort of people who inject drugs was reported at a lower level than what has been estimated for the general U.S. population. Our findings identify a potential barrier to successful implementation of mobile health and Internet-based interventions for people who inject drugs, particularly those who are older and have lower levels of income and educational attainment. As mobile communication technology continues to expand, future studies should re-examine whether mHealth applications become more accessible and accepted by socioeconomically disadvantaged groups.</u>	Journal of Medical Internet Research - mHealth uHealth

<sup>1</sup> Year of publication

<sup>2</sup> Journal Name

Title	Y. <sup>1</sup>	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J. <sup>2</sup>
Mobile phone ownership, usage and readiness to use by patients in drug treatment	2015	Milward, J. et al.	No intervention	Conducted a cross-sectional survey of individuals in treatment for SUDs, replicating and extending existing research to provide a comprehensive overview of mobile phone availability and type; day-to-day phone usage; level of acceptability for geo-location and to establish preferences around contact from services.	UK	Quantitative (survey)	People in treatment for substance use disorders (n=398)	Background: Mobile phone-based interventions using text messages and smartphone apps demonstrate promise for enhancing the treatment of substance use disorders. However, there is limited evidence on the availability of mobile phones among people in substance use treatment, as well as usage patterns, contact preferences and willingness to use phone functions such as geo-location for treatment purposes. Method: A questionnaire was completed by 398 patients enrolled in four UK community drug treatment services. The majority (74%) reported being in treatment for heroin dependence, 9% for alcohol, 4% prescription drugs, 1% amphetamines, 1% club drugs and 1% cannabis. The remaining reported a combination of different drug categories. Results: Eighty-three percent of patients reported owning a mobile phone; 57% of phones were smartphones and 72% of clients had a pay-as-you-go contract. Forty-six percent of phone owners changed their number in the previous year. Eighty-six percent were willing to be contacted by their treatment provider via mobile phone, although 46% thought the use of geo-location to be unacceptable. <u>Conclusion: Mobile phones are widely available among individuals receiving community drug treatment and should be considered as a viable contact method by service providers, particularly text-messaging. However, patients may not have access to sophisticated features such as smartphone apps, and, up to date records of contact numbers must be frequently maintained.</u> Developers need to be sensitive to issues of privacy and invasiveness around geo-location tracking and frequency of contact.	Drug and Alcohol Dependence
Mobile phone and internet use among people who inject drugs: Implications for mobile health interventions	2021	Ozga, J. et al.	Digital technology (mobile phone and internet) uses for PWID	to (1) expand upon prior work by evaluating the stability and continuity of mobile phone and internet use and (2) examine the mobile phone and internet use as a function of participant-, drug-, and injection-related characteristics among PWID recruited.	US	Quantitative (survey)	People who inject drugs (n=494)	Background: Mobile health (mHealth) interventions have the potential to improve substance use treatment engagement and outcomes, and to reduce risk behaviours among people who inject drugs (PWID). However, there are few studies assessing mobile technology use among PWID and none have investigated continuity of mobile phone use. Methods: We surveyed 494 PWID. We used bivariate (independent-sample t- and chi-square tests) and multivariate (logistic regression) analyses to determine whether mobile phone and/or internet use differed as a function of participant- and/or injection-related characteristics. Results: Most participants (77%) had a mobile phone, with 67% having a phone that was free of charge. Participants with a phone were significantly less likely to be homeless (AOR = 0.28), to have shared syringes (AOR = 0.53), and to have reused syringes (AOR = 0.26) in the past 3 months. We observed high rates of phone and number turnover, with more than half reporting that they got a new phone (57%) and/or number (56%) at least once within the past 3 months. Most participants were familiar with using the internet (80% ever use), though participants who had ever used the internet were younger (AOR = 0.89), were less likely to be homeless (AOR = 0.38), were less likely to have shared syringes (AOR = 0.49), and were more likely to have injected methamphetamine by itself (AOR = 2.49) in the past 3 months. <u>Conclusions: Overall, mobile technology and internet use was high among our sample of PWID. Several factors should be considered in recruiting diverse samples of PWID to minimize bias in mHealth study outcomes, including mobile phone access and protocol type (text- vs internet-based).</u>	Journal of Substance Abuse Treatment
Mobile Phone access and preference for technology-assisted aftercare among low-income caregivers of teens enrolled in outpatient substance use treatment: questionnaire study	2019	Ryan-Pettes, S. et al.	Mobile phone-based aftercare support for caregivers of teens in substance use treatment	To determine the feasibility and acceptability of mobile phone-based aftercare support in a population of caregivers with teens in treatment for substance use.	US	Quantitative (survey)	Caregivers of providing service to substance using teens (n=103)	Background: Improvements in parenting practices can positively mediate the outcomes of treatment for adolescent substance use disorder. Given the high rates of relapse among adolescents (i.e., 60% within three months and 85% within one year), there is a critical need for interventions focused on helping parents achieve and maintain effective parenting practices post-treatment. Yet, research suggests that engaging parents in aftercare services is difficult, partly due to systemic structural and personal barriers. One way to increase parent use of aftercare services may be to offer mobile health interventions, given the potential for wide availability and on-demand access. However, it remains unclear whether mobile phone-based aftercare support for caregivers of substance-using teens is feasible or desired. Therefore, formative work in this area is needed.; Objective: This study aims to determine the feasibility and acceptability of mobile phone-based aftercare support in a population of caregivers with teens in treatment for substance use.; Methods: Upon enrolment in a treatment programme, 103 caregivers completed a mobile phone use survey, providing information about mobile phone ownership, access, and use. Caregivers also provided a response to items assessing desire for aftercare services, in general; desire for mobile phone-based aftercare services specifically; and desire for parenting specific content as part of aftercare services. Research assistants also monitored clinic calls made to caregivers' mobile phones to provide an objective measure of the reliability of phone service. Results: Most participants were mothers (76.7%) and self-identified as Hispanic (73.8%). The average age was 42.60 (SD 9.28) years. A total of 94% of caregivers owned a mobile phone. Most had pay-as-you-go phone service (67%), and objective data suggest this did not impede accessibility. Older caregivers more frequently had a yearly mobile contract. Further, older caregivers and caregivers of adolescent girls had fewer disconnections. Bilingual caregivers used text messaging less often; however, caregivers of adolescent girls used text messaging more often. Although 72% of caregivers reported that aftercare was needed, 91% of caregivers endorsed a desire for mobile phone-based aftercare support in parenting areas that are targets of evidence-based treatments. <u>Conclusions: The results suggest that mobile phones are feasible and desired to deliver treatments that provide support to caregivers of teens discharged from substance use treatment. Consideration should be given to the age of caregivers when designing these programmes. Additional research is needed to better understand mobile phone use patterns based on a child's gender and among bilingual caregivers.</u>	Journal of Medical Internet Research – mHealth and uHealth

Title	Y. <sup>1</sup>	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J. <sup>2</sup>
Technology and social media use among patients enrolled in outpatient addiction treatment programs: cross-sectional survey study	2018	Ashford, R. et al.	No intervention	To provide data on patients' with substance use disorders mobile phone ownership rates, usage patterns on multiple digital platforms (social media, internet, computer, and mobile apps), and their interest in the use of these platforms to monitor personal recovery.	US	Quantitative (survey)	People who were attending outpatient substance use disorder treatment programmes (n=259)	BACKGROUND: Substance use disorder research and practice have not yet taken advantage of emerging changes in communication patterns. While internet and social media use is widespread in the general population, little is known about how these mediums are used in substance use disorder treatment. OBJECTIVE: The aims of this paper were to provide data on patients with substance use disorders mobile phone ownership rates, usage patterns on multiple digital platforms (social media, internet, computer, and mobile apps), and their interest in the use of these platforms to monitor personal recovery. METHODS: We conducted a cross-sectional survey of patients in 4 intensive outpatient substance use disorder treatment facilities in Philadelphia, PA, USA. Logistic regressions were used to examine associations among variables. RESULTS: Survey participants (N=259) were mostly male (72.9%, 188/259), African American (62.9%, 163/259), with annual incomes less than US \$10,000 (62.5%, 161/259), and averaged 39 (SD 12.24) years of age. The vast majority of participants (93.8%, 243/259) owned a mobile phone and about 64.1% (166/259) owned a mobile phone with app capabilities, of which 85.1% (207/243) accessed the internet mainly through their mobile phone. There were no significant differences in age, gender, ethnicity, or socio-economic status by computer usage, internet usage, number of times participants changed their phone, type of mobile phone contract, or whether participants had unlimited calling plans. The sample was grouped into 3 age groups (Millennials, Generation Xers, and Baby Boomers). The rates of having a social media account differed across these 3 age groups with significant differences between Baby Boomers and both Generation Xers and Millennials (P<.001 in each case). Among participants with a social media account (73.6%, 190/259), most (76.1%, 144/190) reported using it daily and nearly all (98.2%, 186/190) used Facebook. Nearly half of participants (47.4%, 90/190) reported viewing content on social media that triggered substance cravings and an equal percentage reported being exposed to recovery information on social media. There was a significant difference in rates of reporting viewing recovery information on social media across the 3 age groups with Baby Boomers reporting higher rates than Millennials (P<.001). The majority of respondents (70.1%, 181/259) said they would prefer to use a relapse prevention app on their phone or receive SMS (short message service) relapse prevention text messages (72.3%, 186/259), and nearly half (49.1%, 127/259) expressed an interest in receiving support by allowing social media accounts to be monitored as a relapse prevention technique. <u>CONCLUSIONS: To our knowledge, this is the first and largest study examining the online behaviour and preferences regarding technology-based substance use disorder treatment interventions in a population of patients enrolled in community outpatient treatment programmes. Patients were generally receptive to using relapse prevention apps and text messaging interventions and a substantial proportion supported social media surveillance tools. However, the design of technology-based interventions remains as many participants have monthly telephone plans which may limit continuity.</u>	Journal of Medical Internet Research
Utilization of communication technology by patients enrolled in substance abuse treatment	2013	McClure, E. et al.	Communication technology (telehealth management programme) for substance use disorder	A survey was conducted to characterise utilisation of communication technology in 266 urban, substance abuse treatment patients enrolled at eight drug-free, psychosocial or opioid-replacement therapy clinics.	US	Quantitative (survey)	People who are currently enrolled in problem substance use treatment (n=266)	Background: Technology-based applications represent a promising method for providing efficacious, widely available interventions to substance abuse treatment patients. However, limited access to communication technology (i.e., mobile phones, computers, internet, and e-mail) could significantly impact the feasibility of these efforts, and little is known regarding technology utilisation in substance abusing populations. Methods: A survey was conducted to characterise utilisation of communication technology in 266 urban, substance abuse treatment patients enrolled at eight drug-free, psychosocial or opioid-replacement therapy clinics. Results: Survey participants averaged 41 years of age and 57% had a yearly household income of less than \$15,000. The vast majority reported access to a mobile phone (91%), and to SMS text messaging (79%). Keeping a consistent mobile phone number and yearly mobile contract was higher for White participants, and also for those with higher education, and enrolled in drug-free, psychosocial treatment. Internet, e-mail, and computer use was much lower (39–45%), with younger age, higher education and income predicting greater use. No such differences existed for the use of mobile phones however. <u>Conclusions: Concern regarding the digital divide for marginalized populations appears to be disappearing with respect to mobile phones, but still exists for computer, internet, and e-mail access and use. Results suggest that mobile phone and texting applications may be feasibly applied for use in programme–client interactions in substance abuse treatment. Careful consideration should be given to frequent phone number changes, access to technology, and motivation to engage with communication technology for treatment purposes.</u>	Drug and Alcohol Dependence

Title	Y.	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
<b>2. Provision of other digital technology e.g., computers, laptops and tablets</b>									
Use of telehealth in substance use disorder services during and after COVID-19: online survey study	2021	Molfenter, T. et al.	Telehealth (telephone and video) technologies for SUD services	(1) to assess the use of telehealth (telephone and video technologies) for different SUD services during COVID-19 in May-June 2020, (2) to assess the intended applications of telehealth for SUD services beyond COVID-19, (3) to evaluate the perceived ease of use and value of telehealth for delivering SUD services, and (4) to assess organisational readiness for the sustained use of telehealth services.	US	Quantitative (survey)	Service providers who deliver treatment for substance use disorders (n=457)	Background: Social distancing guidelines for COVID-19 have caused a rapid transition to telephone and video technologies for delivering treatment for substance use disorders (SUDs).; Objective: This study examined the adoption of these technologies across the SUD service continuum, acceptance of these technologies among service providers, and intent of providers to use these technologies after the pandemic. Additional analysis using the validated technology acceptance model (TAM) was performed to test the potential applications of these technologies after the pandemic. The study objectives were as follows: (1) to assess the use of telehealth (telephone and video technologies) for different SUD services during COVID-19 in May-June 2020, (2) to assess the intended applications of telehealth for SUD services beyond COVID-19, (3) to evaluate the perceived ease of use and value of telehealth for delivering SUD services, and (4) to assess organisational readiness for the sustained use of telehealth services.; Methods: An online survey on the use of telephonic and video services was distributed between May and August 2020 to measure the current use of these services, perceived organisational readiness to use these services, and the intent to use these services after COVID-19. In total, 8 of 10 regional Addiction Technology Transfer Centres representing 43 states distributed the survey. Individual organisations were the unit of analysis. Results: In total, 457 organisations responded to the survey. Overall, the technology was widely used; >70% (n>335) of organisations reported using telephone or video platforms for most services. The odds of the intent of organisations to use these technologies to deliver services post COVID-19 were significantly greater for all but two services (i.e., telephonic residential counselling and buprenorphine therapy; mean odds ratio 3.79, range 1.87-6.98). Clinical users preferred video technologies to telephone technologies for virtually all services. Readiness to use telephone and video technologies was high across numerous factors, though telephonic services were considered more accessible. Consistent with the TAM, perceived usefulness and ease of use influenced the intent to use both telephone and video technologies. <u>Conclusions: The overall perceived ease of use and usefulness of telephonic and video services suggest promising post-COVID-19 applications of these services. Survey participants consistently preferred video services to telephonic services; however, the availability of telephonic services to those lacking easy access to video technology is an important characteristic of these services. Future studies should review the acceptance of telehealth services and their comparative impact on SUD care outcomes.</u>	Journal of Medical Internet Research - Mental Health
The drug addicts' usage of information and communication technologies	2020	Mimigiannis, C. et al.	ICT usage by drug addicts	A short paper discussed about pilot study related to the use of ICT by drug addicts	Greece	Quantitative (Survey)	People who use psychoactive substances (n=204)	Information and Communication Technologies (ICT) are broadly used to support people's daily needs. Individuals addicted to psychoactive drugs sometimes present social exclusion as well as, limitations to the usage of ICT such as Internet, devices and applications. The aim of this paper is to present the findings of a pilot study related to the use of 'Information and Communication Technologies by Drug Addicts' ( <u>not our language</u> ). A survey was conducted on 204 users of psychoactive substances. According to the results, the majority of the 'drug addicts' seem to use ICT on a daily basis, showing their preference on Smartphones compared to other devices. The Internet access and the usage of Social Media and Communication Networks by addicted individuals is quite high, probably because they are willing to reintegrate into the society through Social Networks. Age is often related to the usage of ICT on Drug Addicts ( <u>not our language</u> ).	Studies in Health Informatics
A systematic review of the mHealth interventions to prevent alcohol and substance abuse	2017	Kazemi, D. et al.	mHealth-based interventions for substance use	Evaluated the recent body of research on mHealth-based interventions for substance use, with aims of (a) examining the functionality and effectiveness of these interventions, (b) evaluating the available research on the effectiveness of these interventions for substance use, and (c) evaluating the design, methodology, results, theoretical grounding, limitations, and implications of each study	Undertaken in the US but with an international focus.	Systematic review – 12 papers included	People with problem substance use	Substance abuse in young adults is a public health issue with costs to the individual and society. There is mounting evidence that the increased uses of mHealth approaches have promise as a way to facilitate reductions in substance use. This systematic review evaluated the recent body of research on mHealth-based interventions for substance use, with aims of (a) examining the functionality and effectiveness of these interventions, (b) evaluating the available research on the effectiveness of these interventions for substance use, and (c) evaluating the design, methodology, results, theoretical grounding, limitations, and implications of each study. We identified eligible studies by searching electronic databases using Boolean methods. The reviewed studies (N = 12) indicated that a wide range of Internet-based, text messaging, and smartphone application interventions have been developed to address substance use. Interventions had an assortment of features; participants in each study highlighted the ease and convenience of the interventions; and the majority of studies provided support for the efficacy of mHealth in reducing substance use. <u>Mobile technology is a promising tool for reducing substance use and warrants further development. Future practice including the use of mHealth interventions can be an integral part of reducing substance use.</u>	Journal of Health Communication

Title	Y.	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
Homeless drug users and information technology: A qualitative study with potential implications for recovery from drug dependence	2014	Neale, J. & Stevenson, C.	No intervention	This paper seeks to: i. explore the engagement of homeless drug users (HDUs) with ICTs and ii. discuss the findings with reference to recovery from drug dependence.	UK	Qualitative (semi-structured interviews)	People who are experiencing problem drug use and homelessness (n=52)	Background: Having access to information and communication technologies (ICTs) is a prerequisite to meaningful participation in society. Objectives: This paper seeks to: i. explore the engagement of homeless drug users (HDUs) with ICTs and ii. discuss the findings with reference to recovery from drug dependence. Methods: The study design was qualitative and longitudinal, involving data collected in 2012–13 via 52 semi-structured interviews with 30 homeless drug users (25 men; five women). Participants were recruited from 17 hostels in two English cities. Interview data were analysed using Framework. Results: HDUs had access to ICTs, used ICTs, and wanted to engage with them more. Experiences of digital exclusion were a function of participants' inability to afford ICTs, the relatively cheap and poor quality technology available to them, limited knowledge about ICTs, and lack of support in using them. That HDUs were often unable to take full advantage of technology because they had nobody to explain what their devices could do or to show them how they worked was ironic given that using ICTs to (re)establish and maintain relationships were functions of technology that HDUs particularly liked. <u>Conclusions: The physical, human, cultural, and social capital of HDUs influenced their access to, and use of, ICTs. Equally, ICTs were themselves an important recovery resource. Services and others should provide HDUs with easy access to good quality technology, as well as offers of support and education so that all individuals have the knowledge and confidence to make optimum use of the technology that is available to them.</u>	Substance Use and Misuse

Title	Y.	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
<b>3. Provision of support and skills training</b>									
Using telecare to treat opioid use disorder: an ethnographic study in New York during COVID-19	2021	Caulfield, C .	Community-based use of digital technology (online) for recovery or treatment during COVID-19	This participative research approach enabled me to consult with community members about my evolving understanding of how telecare can both produce and reduce harms for people in treatment.	US	Qualitative (ethnography and interviews)	People who attended to treatment for opioid use disorder or seeking treatment (n=14)	This paper presents an in-person and digital ethnography of people in New York State who use drugs and seek treatment for opioid use disorder (OUD) using phone or video connection to receive healthcare (telecare) including interviews prior to and during the COVID-19 pandemic. This article leverages a Feminist and Science and Technology Studies (STS) approach to elucidate how the framing of the opioid crisis shapes the interconnections that are discernible, providing a heuristic to understand the increased rates of deaths due to drug overdose during the pandemic. The narratives of people seeking treatment are analysed through the theoretical lenses of Nelly Oudshoorn's concept of the techno geography of care, Nancy Campbell's concept of technologies of suspicion, and Nancy Fraser's analysis of the US juridical-administrative-therapeutic in/justice system. This paper traces and problematizes how telecare contributes to redefining the experience of familiar places, such as home, into spaces of both care and surveillance, and how the technology of telecare presents both affordances and foreclosures to accessing care as people struggle to conform with its requirements in order to receive care. <u>Key findings are, (1) the significance of hugs and tactile connection that is sorely missed by people using telecare for group therapy, (2) the critical importance of proximity to in-person services even while using telecare, (3) the resistance strategies of telecare users to surveillance mechanisms, and (4) the continued stigmatization of drug use and treatment acts as a key barrier to people who are striving to produce the identity of a patient who is clinically stable for take-home medication.</u>	Contemporary Drug Problems
Effectiveness of eHealth technology-based interventions in reducing substance misuse among older adults: a systematic review	2021	Kazemi, D. et al.	eHealth interventions delivered to older adults who are experiencing problems of substance use	(1) to examine the effectiveness of eHealth interventions for older American adults treated for substance use problems and (2) to investigate behavioural outcomes and reduction of substance misuse among older adults.	Undertaken in the US but with an international focus	Systematic review - 7 papers included	Older adults in treatment for problem substance use	Generally considered an epidemic among young people, substance misuse has been a growing issue among older Americans for the past 40 years. Legal substances, such as alcohol, tobacco, and prescription drugs, including opioids and marijuana, are of primary concern when it comes to aging Baby Boomers. By 2050, 22% of Americans will be aged ≥65 years. Currently, eHealth interventions are receiving attention in treating substance misuse among younger Americans. The current study has two aims: to evaluate the effectiveness of eHealth interventions for older adults treated for substance misuse problems, as well as to investigate behavioural outcomes in reducing substance misuse. A comprehensive search of databases yielded 35,041 articles that examined reductions in substance misuse and problem behaviours as a primary outcome with eHealth interventions delivered to older adults. Once duplicate and irrelevant articles were removed, seven were left to be analysed. <u>Findings suggest use of technology to assess and intervene with older adults using various substances shows promise and, as a whole, older adults are receptive to online learning, screening and assessment, and interventions.</u>	Journal of Gerontological Nursing

Title	Y.	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
<b>4. Improved access to the public internet</b>									
Digital Capacity and Interest in mHealth interventions among individuals on opioid agonist maintenance treatment: a cross-sectional community-based study	2021	Ganesh, R. et al.	Digital technology for people with substance use problem in India	Most people accessing opioid agonist treatment in a community have mobile phones, have access to the Internet, and are interested in receiving help through mHealth technology for their substance use problem. mHealth technology can be exploited to plug some of the gaps in the treatment of opioid dependence syndrome.	India	Qualitative (interviews)	People on opioid agonist treatment (n=153)	Background: Integrating mobile technologies in healthcare (mHealth) is helpful to manage various medical conditions. mHealth applications can bridge the gap in the management of patients with opioid use disorder (OUD). Research evaluating the feasibility of mHealth to address OUD is limited in developing countries. We aimed to assess the digital capacity and interest in mHealth interventions in patients maintained on opioid agonist treatment (OAT). Methods: 150 patients on OAT from a community drug treatment clinic in New Delhi, India, were included. We assessed the participants on their pattern of mobile and Internet use and their willingness to use mHealth technology to access health information and services related to OUD. Results: 88% of participants (n = 132) owned a mobile phone at assessment; 2.7% (n = 4) had never used a mobile phone in their lifetime. 70% (n = 105) participants had Internet access. 80% (n = 120) of participants showed interest in receiving text messages related to the management of OUD. 60% of participants showed a willingness to download and use applications for monitoring their substance use. <u>Conclusions: In India, there is an interest among people on OAT to use mHealth interventions to manage their substance use. This population also has access to mobile phones and the necessary knowledge to install and run applications needed for various mHealth interventions.</u>	Indian Journal of Psychological Medicine
Addiction treatment and telehealth: review of efficacy and provider insights during the COVID-19 pandemic	2021	Mark, T. et al.	Telehealth services for addiction treatment (comparison with in-person treatment)	The effectiveness of telehealth versus in-person substance use disorder treatment for most patients for various services during the pandemic supports the continued use of telehealth after the pandemic.	US	Mixed methods involving literature review (8 papers included), quantitative (survey) and qualitative (interviews)	Treatment providers and other stakeholders to addiction treatment (survey, n=100 and interview, n=30)	Objective: Addiction treatment via telehealth expanded to unprecedented levels during the COVID-19 pandemic. This study aimed to clarify whether the research evidence on the efficacy of telehealth-delivered substance use disorder treatment and the experience of providers using telehealth during the pandemic support continued use of telehealth after the pandemic and, if so, under what circumstances.; Methods: Data sources included a literature review on the efficacy of telehealth for substance use disorder treatment, responses to a 2020 online survey from 100 California addiction treatment providers, and interviews with 30 California treatment providers and other stakeholders.; Results: Eight published studies were identified that compared addiction treatment via telehealth with in-person treatment. Seven found telehealth treatment as effective but not more effective than in-person treatment in terms of retention, therapeutic alliance, and substance use. One Canadian study found that telehealth facilitated methadone prescribing and improved retention. In the survey results reported here, California addiction treatment providers said that more than 50% of their patients were being treated via telehealth for intensive outpatient treatment, individual counselling, group counselling, and intake assessment. They were most confident that individual counselling via telehealth was as effective as in-person individual counselling and less sure about the relative effectiveness of telehealth-delivered medication management, group counselling, and intake assessments.; Conclusions: Telehealth may help engage patients in addiction treatment by improving access and convenience. Additional research is needed to confirm that benefit and to determine how best to tailor telehealth to each patient's circumstances and with what mix of in-person and telehealth services.	Psychiatric Services
Utilization of telehealth solutions for patients with opioid use disorder using buprenorphine: a scoping review	2021	Guillen, A. et al.	Telehealth interventions for people with opioid use disorder who are using buprenorphine	These studies examined the effect of telehealth on patient satisfaction, treatment retention rates, and buprenorphine accessibility and adherence.	Undertaken in US but with an international focus.	Scoping review - 69 papers included	Patients with opioid use disorder using buprenorphine	Background: A scoping review was conducted to examine the breadth of evidence related to telehealth innovations being utilized in the treatment of opioid use disorder (OUD) with buprenorphine and its effect on patient outcomes and health care delivery. Materials and Methods: The authors systematically searched seven databases and websites for peer-reviewed and grey literature related to telehealth solutions for buprenorphine treatment published between 2008 and March 18, 2021. Two reviewers screened titles and abstracts for articles that met the inclusion criteria, according to the scoping review study protocol. The authors included studies if they specifically examined telehealth interventions aimed at improving access to and usage of buprenorphine for OUD. Results: After screening 371 records, the authors selected 69 for full review. These studies examined the effect of telehealth on patient satisfaction, treatment retention rates, and buprenorphine accessibility and adherence. <u>Conclusion: According to the reviewed literature, incorporation of telehealth technology with medication-assisted treatment for OUD is associated with higher patient satisfaction, comparable rates of retention, an overall reduction in health care costs, and an increase in both access to and usage of buprenorphine. This has been made possible through the expansion of telehealth technologies and a substantial push toward relaxed federal guidelines, both of which were quickly escalated in response to the COVID-19 pandemic. Future research is needed to fully quantify the effect of these factors; however, the results appear promising thus far and should urge policymakers to consider making these temporary policy changes permanent.</u>	Telemedicine and e-Health

Title	Y.	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
<b>5. Innovative skills training</b>									
Telehealth adoption by mental health and substance use disorder treatment facilities in the COVID-19 pandemic	2021	Cantor, J. et al.	Telehealth in Covid 19 offering for mental health and substance use disorder treatment	To examined temporal and geographic trends in telehealth availability at U.S. behavioural health treatment facilities and risk factors for not offering telehealth.	US	Quantitative (Data extracted from SAMHSA treatment services locator database)	People in mental health and substance use disorder treatment (n=15691)	Objective: The study examined temporal and geographic trends in telehealth availability at U.S. behavioural health treatment facilities and risk factors for not offering telehealth. Methods: Longitudinal data on 15,691 outpatient behavioural health treatment facilities were extracted daily from the Substance Abuse and Mental Health Services Administration's Behavioural Health Treatment Services Locator between January 20, 2020, and January 20, 2021. Facilities operated by the Department of Veterans Affairs were excluded. Bivariate analyses were used to assess trends in telehealth availability in 2020 and 2021. Multivariable regression analysis was used to examine facility- and county-level characteristics associated with telehealth availability in 2021. Results: Telehealth availability increased by 77% from 2020 to 2021 for mental health treatment facilities and by 143% for substance use disorder treatment facilities. By January 2021, 68% of outpatient mental health facilities and 57% of substance use disorder treatment facilities in the sample were offering telehealth. Mental health and substance use disorder treatment facilities that did not accept Medicaid as a form of payment were less likely to offer telehealth in 2021, compared with facilities that accepted Medicaid. Mental health and substance use disorder treatment facilities that accepted private insurance were more likely to offer telehealth in 2021, compared with facilities that did not accept private insurance. <u>Conclusions: Although 2020 saw a dramatic increase in telehealth availability at behavioural health treatment facilities, 32% of mental health treatment facilities and 43% of substance use disorder treatment facilities did not offer telehealth in January 2021, nearly 1 year into the pandemic.</u>	Psychiatric Services
Virtually possible: using telehealth to bring reproductive health care to women with opioid use disorder in rural Maine	2020	Thompson, T. et al.	Telehealth for pregnant women with OUD	Feasibility of the intervention administered to women seeking OUD-supportive services.	US	Quantitative (survey)	Pregnant women who use opioids (n=51)	BACKGROUND: Maternal opioid use disorder (OUD) has increased more sharply in recent years among rural residents in the United States than among urban residents. In 2018, the prevalence of maternal OUD accounted for 3.5% of all hospital deliveries in Maine. Opioid use during pregnancy is associated with negative health effects for both the woman and infant. While many women with OUD use contraception, few report using a highly reliable method. METHODS: A family planning clinic in Maine piloted a programme to increase reproductive health access for women with OUD through the use of telehealth. In this model, a community outreach educator travelled to a community organisation that serves this population to provide reproductive health information and an opportunity to connect with a nurse practitioner via telehealth to receive the following reproductive health services: HIV counselling and testing, contraception, or pregnancy testing and counselling. We assessed the feasibility of this programme through the following outcome measures: number of women who engaged with the community outreach educator, number of women who used telehealth services, and number of women who received services at a referred clinic during the six-month pilot. RESULTS: During the pilot programme, the community outreach educator held eighteen educational sessions and engaged fifty-one women; providing condoms and/or answers to various reproductive health questions. Fifteen women used telehealth services. The majority used the service to receive testing for sexually transmitted infections (STI) such as HIV. Four women used telehealth for contraceptive services and received either birth control or the Depo-Provera injectable on-site. A third of the women received more than one reproductive health service via telehealth. Of the women who were referred to a family planning clinic for additional services, only 2 attended their appointment. No challenges with hearing or seeing the practitioner through the video platform were recorded. <u>CONCLUSIONS: Improving women's access to effective contraceptive methods and preventive reproductive health services is critical to ensuring women with OUD are able to seek effective treatment and to ensure the health of future pregnancies. Findings from this pilot programme suggest that innovative health care models such as on-site provision of reproductive health care through telehealth have the potential to increase access to reproductive care for this hard-to-reach population.</u>	mHealth
Description of a pharmacist-led clinical video telehealth group clinic for opioid overdose prevention and naloxone education	2019	Jensen, A. et al.	Clinical video telehealth (CVT) technology for overdose education and naloxone distribution	to increase access to overdose education and naloxone distribution (OEND) to at-risk patients across urban and rural areas by using clinical video telehealth (CVT)	US	Quantitative (survey)	Patients who were prescribed naloxone (n=397)	To achieve the nationwide goal of reducing opioid-related deaths, a clinical pharmacy specialist-led clinical video telehealth (CVT) clinic was created at a Veterans Affairs medical centre (VAMC) to deliver opioid overdose prevention and naloxone education to at-risk patients. The purpose of this innovative practice was to improve access to this potentially life-saving intervention to patients across urban and rural areas. This study is a single-centre, descriptive analysis of adult patients across 2 VAMC campuses and 4 community-based outpatient clinics from July 11, 2016, through December 31, 2016. The purpose of this innovative practice was to increase access to overdose education and naloxone distribution (OEND) to at-risk patients across urban and rural areas. Patient-specific factors were also examined among those receiving naloxone through the CVT clinic compared to other prescribers. During the first 6 months from the initiation of the clinic, 1 pharmacist prescribed 21% of the health care system's naloxone. These patients identified by the pharmacist-led CVT clinic were more likely to be considered high-risk due to concomitant use of opioids and benzodiazepines. <u>In conclusion, the pharmacist-led CVT group clinic has been an efficient strategy to extend OEND services to high-risk patients beyond central, urban areas.</u>	The Mental Health Clinician

Title	Y.	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
<b>6. Development of local software applications</b>									
Substance use treatment in Appalachian Tennessee amid COVID-19: Challenges and preparing for the future	2021	Kedia , S. et al.	eHealth treatment solutions for people with SUD	This article explores the pandemic's impact on an already structurally disadvantaged region, its recovery community, and those who serve it.	US	Qualitative (interviews)	People with substance use disorders, treatment providers and other stakeholders	The COVID-19 pandemic created a number of rapidly emerging and unprecedented challenges for those engaged in substance use disorder (SUD) treatment, forcing service providers to improvise their treatment strategies as the crisis deepened. Drawing from five ongoing federally funded SUD projects in Appalachian Tennessee and hundreds of hours of meetings and interviews, this article explores the pandemic's impact on an already structurally disadvantaged region, its recovery community, and those who serve it. More specifically, we note detrimental effects of increased isolation since the implementation of COVID-19 safety measures, including stakeholders' reports of higher incidences of relapse, overdose, and deaths in the SUD population. Treatment providers have responded with telehealth services, but faced barriers in technology access and computer literacy among clients. Providers have also had to restrict new clients to accommodate social distancing, faced delays in health screening those they can accept, and denied family visitations, which has affected retention. In light of these challenges, several promising lessons for the future emerged--such as preparing for an influx of new and returning clients in need of SUD treatment; making arrangements for long-term housing and facility modification; developing a hybrid care delivery model, taking advantage of new regulations enabling telemedicine; budgeting for and storing personal protective equipment (PPE) and related supplies; and developing disaster protocols to withstand threats to intake, retention, and financial solvency.	Journal of Substance Abuse Treatment
Substance Use disorders and telehealth in the COVID-19 pandemic era: a new outlook	2020	Oesterle , T. et al.	Telehealth service for SUD	The evidence base for telehealth services and provides recommendations for evidenced-based, safely delivered, SUD-focused telehealth visits.	US	Reviews current literature (no detail provided re. methods/number of papers included)	Patients with substance use disorders	During the current coronavirus disease 2019 epidemic, many outpatient chemical dependency treatment programmes and clinics are decreasing their number of in-person patient contacts. This has widened an already large gap between patients with substance use disorders (SUDs) who need treatment and those who have actually received treatment. For a disorder where group therapy has been the mainstay treatment option for decades, social distancing, shelter in place, and treatment discontinuation have created an urgent need for alternative approaches to addiction treatment. In an attempt to continue some care for patients in need, many medical institutions have transitioned to a virtual environment to promote safe social distancing. Although there is ample evidence to support telemedical interventions, these can be difficult to implement, especially in the SUD population. This article reviews current literature for the use of telehealth interventions in the treatment of SUDs and offers recommendations on safe and effective implementation strategies based on the current literature.	Mayo Clinic Proceedings
Comparison of smartphone ownership, social media use, and willingness to use digital interventions between generation z and millennials in the treatment of substance use: Cross-sectional questionnaire study	2019	Curtis , B. et al.	Digital platform (social media) for outpatient substance use treatment	To compare digital platforms (SM) used among adolescents (age 13-17) and emerging adults (age 18-35) attending outpatient substance use treatment and to examine receptiveness toward these platforms in order to support substance use treatment and recovery.	US	Quantitative (survey)	Participants who adolescents people (age 13-17) and emerging adults (age 18-35) (n=164)	<b>BACKGROUND:</b> Problematic substance use in adolescence and emerging adulthood is a significant public health concern in the United States due to high recurrence of use rates and unmet treatment needs coupled with increased use. Consequently, there is a need for both improved service utilisation and availability of recovery supports. Given the ubiquitous use of the internet and social media via smartphones, a viable option is to design digital treatments and recovery support services to include internet and social media platforms. <b>OBJECTIVE:</b> Although digital treatments delivered through social media and the internet are a possibility, it is unclear how interventions using these tools should be tailored for groups with problematic substance use. There is limited research comparing consumer trends of use of social media platforms, use of platform features, and vulnerability of exposure to drug cues online. The goal of this study was to compare digital platforms used among adolescents (Generation Zs, age 13-17) and emerging adults (Millennials, age 18-35) attending outpatient substance use treatment and to examine receptiveness toward these platforms in order to support substance use treatment and recovery. <b>METHODS:</b> Generation Zs and Millennials enrolled in outpatient substance use treatment (n=164) completed a survey examining social media use, digital intervention acceptability, frequency of substance exposure, and substance use experiences. Generation Zs (n=53) completed the survey in July 2018. Millennials (n=111) completed the survey in May 2016. <b>RESULTS:</b> Generation Zs had an average age of 15.66 (SD 1.18) years and primarily identified as male (50.9%). Millennials had an average age of 27.66 (SD 5.12) years and also primarily identified as male (75.7%). Most participants owned a social media account (Millennials: 82.0%, Generation Zs: 94.3%) and used it daily (Millennials: 67.6%, Generation Zs: 79.2%); however, Generation Zs were more likely to use Instagram and Snapchat, whereas Millennials were more likely to use Facebook. Further, Generation Zs were more likely to use the features within social media platforms (e.g., instant messaging: Millennials: 55.0%, Generation Zs: 79.2%; watching videos: Millennials: 56.8%, Generation Zs: 81.1%). Many participants observed drug cues on social media (Millennials: 67.5%, Generation Zs: 71.7%). However, fewer observed recovery information on social media (Millennials: 30.6%, Generation Zs: 34.0%). Participants felt that social media (Millennials: 55.0%, Generation Zs: 49.1%), a mobile phone app (Millennials: 36.9%, Generation Zs: 45.3%), texting (Millennials: 28.8%, Generation Zs: 45.3%), or a website (Millennials: 39.6%, Generation Zs: 32.1%) would be useful in delivering recovery support. <b>CONCLUSIONS:</b> <u>Given the high rates of exposure to drug cues on social media, disseminating recovery support within a social media platform may be the ideal just-in-time intervention needed to decrease the rates of recurrent drug use. However, our results suggest that cross-platform solutions capable of transcending generational preferences are necessary and one-size-fits-all digital interventions should be avoided.</u>	Journal of Medical Internet Research

Title	Y.	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
<b>7. Development of digital services</b>									
"How can I hug someone now [over the phone]?": Impacts of COVID-19 on peer recovery specialists and clients in substance use treatment	2021	Anvari, M. et al.	Phone recovery service for those with substance use disorders (SUDs)	To examine: (1) the impact of COVID-19 on the peer recovery specialists PRS role and experience, (2) the impact of COVID-19 on clients in or seeking SUD treatment, (3) facilitators for clients engaging in treatment and adapting to new changes, and (4) sustainability of new treatment methods post-pandemic.	US	Qualitative (semi-structured interviews)	Peer recovery specialists (PRSs) (n=15)	Introduction: The COVID-19 pandemic has disproportionately affected underserved, low-income, ethno-racial minority communities, as well as those with substance use disorders (SUDs). The workforce of peer recovery specialists (PRSs), individuals with lived substance use and recovery experience, has rapidly expanded in response to a shortage of access to substance use treatment, particularly for those from underserved communities. As PRSs are likely serving individuals disproportionately affected by the pandemic, it is important to understand how COVID-19 has affected the PRS role and the individuals with SUD who they are supporting. Method: This study aimed to examine: (1) the impact of COVID-19 on the PRS role and experience, (2) the impact of COVID-19 on clients in or seeking SUD treatment, (3) facilitators for clients engaging in treatment and adapting to new changes, and (4) sustainability of new treatment methods post-pandemic. Results: Findings suggest that PRSs have had to adapt their role and responsibilities to meet changing client needs; however, PRS strengths, such as their shared experience and expertise navigating treatment barriers, make them uniquely suited to assist clients during the pandemic. The study identified various barriers and facilitators to clients seeking treatment or living with SUD, such as the loss of interpersonal connection. PRSs also identified some drawbacks to utilising telehealth, but identified this as a potentially sustainable approach to delivering care after the pandemic. <b>Conclusion: Future research could explore challenges to fulfilling the PRS role, as well as adaptations to overcome these challenges over time.</b>	Journal of Substance Abuse Treatment
Online digital recovery support services: An overview of the science and their potential to help individuals with substance use disorder during COVID-19 and beyond	2021	Bergman, B., & Kelly, J.	Social-online digital recovery support service (D-RSS)	This review outlines the following: 1) theories of expected therapeutic benefits from, and potential drawbacks of social-online D-RSS participation; 2) a typology that can be used to describe and classify D-RSS; 3) a D-RSS "case study" to illustrate how to apply the theory and typology; 4) what is known empirically about social-online D-RSS; and 5) whether and how to engage individuals with these online resources.	Undertaken in US	Narrative review (no detail provided re. methods/number of papers included)	People with substance use disorder	BACKGROUND: The COVID-19 pandemic and related social distancing public health recommendations will have indirect consequences for individuals with current and remitted substance use disorder (SUD). Not only will stressors increase risk for symptom exacerbation and/or relapse, but individuals will also have limited service access during this critical time. Individuals with SUD are using free, online digital recovery support services (D-RSS) that leverage peer-to-peer connection (i.e., social-online D-RSS) which simultaneously help these individuals to access support and adhere to public health guidelines. Barriers to SUD treatment and recovery support service access, however, are not unique to the COVID-19 epoch. The pandemic creates an opportunity to highlight problems that will persist beyond its immediate effects, and to offer potential solutions that might help address these long-standing, systemic issues. To help providers and other key stakeholders effectively support those interested in, or who might benefit from, participation in free, social-online D-RSS, this review outlines the following: 1) theories of expected therapeutic benefits from, and potential drawbacks of social-online D-RSS participation; 2) a typology that can be used to describe and classify D-RSS; 3) a D-RSS "case study" to illustrate how to apply the theory and typology; 4) what is known empirically about social-online D-RSS; and 5) whether and how to engage individuals with these online resources. METHOD: Narrative review combining research and theory on both in-person recovery supports and social-online D-RSS. RESULTS: Studies examining in-person recovery support services, such as AA and other mutual-help organisations, combined with theory about how social-online D-RSS might confer benefit, suggest these digital supports may engage individuals with SUD and mobilize salutary change in similar ways. While people may use in-person and digital supports simultaneously, when comparing the two modalities, communication science and telemedicine group therapy data suggest that D-RSS may not provide the same magnitude of benefit as in-person services. D-RSS can be classified based on the a) type of service, b) type of platform, c) points of access, and d) organisations responsible for their delivery. Research has not yet rigorously tested the effectiveness of social-online D-RSS specifically, though existing data suggest that those who use these services generally find their participation to be helpful. Content analyses suggest that these services are likely to facilitate social support and unlikely to expose individuals to harmful situations. <b>CONCLUSIONS: When in-person treatment and recovery support services are limited, as is the case during the COVID-19 pandemic, expected therapeutic benefits and emerging data, taken together, suggest providers, mentors, and other community leaders may wish to refer individuals with current and remitted SUD to free, social-online D-RSS. Given the array of available services in the absence of best practice guidelines, we recommend that when making D-RSS referrals, stakeholders familiarize themselves with theorized benefits and drawbacks of participation, use a typology to describe and classify services, and integrate current empirical knowledge, while relying on trusted federal, academic, and national practice organisation resource lists.</b>	Journal of Substance Abuse Treatment

Title	Y.	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
The new services that opioid treatment programs have adopted in response to COVID-19	2021	Cantor, J. & Laurito, A.	No intervention	Most opioid treatment programmes (OTPs) are taking new patients (91%). Roughly 83% of them screen for COVID-19 symptoms for in-person visits and about 92% use social distancing measures. More than half of OTPs provide curb side treatment (83%) or telehealth (81%). Less than a quarter of OTPs offer medication drop off (21%) or pick up by a trusted person (32%) when patients need to quarantine due to COVID-19.	US	Quantitative (survey)	People who worked for opioid treatment programmes (n=373)	COVID-19 has exacerbated the opioid epidemic and transformed how programmes treat opioid use disorder. In response to the pandemic, the federal government modified guidelines to allow opioid treatment programmes (OTPs) greater flexibility in the provision of medication for opioid use disorder. We conducted a telephone survey of 31.10% of OTPs in the contiguous United States between June and July 2020. We contacted a random sample of 477 facilities and obtained responses from 373. The survey asked questions about new patient intake, screening for COVID-19, social distancing measures, as well as new treatments offered due to changes in federal government policy. We calculated percentages of positive and non-positive responses to each survey question. We estimated logistic regressions of facility-, county- and state-level predictors of each treatment approach. Most OTPs are taking new patients (91%). Roughly 83% of them screen for COVID-19 symptoms for in-person visits and about 92% use social distancing measures. More than half of OTPs provide curb side treatment (83%) or telehealth (81%). Less than a quarter of OTPs offer medication drop off (21%) or pick up by a trusted person (32%) when patients need to quarantine due to COVID-19. <u>Results from multivariable logistic regressions show that OTPs in states that had a shelter-in-place policy are more likely to socially distance for in-person visits than those in states without such a policy.</u>	Journal of Substance Abuse Treatment
Telepsychiatry in an Alaska native residential substance abuse treatment program	2020	Legha, R. et al.	telehealth (tele-psychiatry) service for residential substance abuse treatment	evaluation of tele-psychiatry clinic's impact on a residential substance abuse treatment serving the Alaska Native community (comparison).	US	Quantitative (online medical records for those who received tele-psychiatry and those who did not)	People in problem substance use treatment (n=206)	Introduction: Alaska Native communities experience high rates of alcohol and substance abuse and face challenges accessing quality, culturally appropriate treatment. Tele-psychiatry could help bridge this gap, but no publications have examined its impacts for alcohol and substance abuse treatment directed at Alaska Native communities. This study explores one tele-psychiatry clinic's impact on a residential substance abuse treatment serving the Alaska Native community in Anchorage, Alaska. Methods: Using a matched case-control design, 103 cases receiving tele-psychiatry services between 2007 and 2012 were matched with 103 controls who did not. Outcome measures included length of stay, discharge plans, emergency room visits, and hospital admissions; clinical history, including previous suicide attempts, history of violence, and trauma history; social stressors such as current legal issues, unemployment, and homelessness; mental health, medical, and substance abuse diagnoses; and number of tele-psychiatry appointments and nature of tele-psychiatry services rendered. Results: Both groups exhibited high rates of mental and medical illness, socioeconomic challenges, and substance abuse. However, the tele-psychiatry group demonstrated a significantly higher rate of post-traumatic stress disorder, history of violence, ongoing legal issues, and children in outside custody. It also remained engaged in treatment longer, had fewer discharges against medical advice, and was more likely to complete treatment. <u>Discussion/Conclusions: Our study highlights this tele-psychiatry clinic's real-world difference serving the complex substance abuse treatment needs of Alaska Native individuals. It also reinforces tele-psychiatry's promise in serving other communities facing a high burden of addiction and mental illness yet facing barriers to high-quality, culturally competent services.</u>	Telemedicine and e-Health
Health center implementation of telemedicine for opioid use disorders: A qualitative assessment of adopters and nonadopters	2020	Uscher-Pines, L. et al.	Telemedicine for the treatment of opioid use disorders	Defined different tele-ODD services of US health centres for treatment as well as reasons for non-adoption.	US	Qualitative (semi-structured interviews)	Service providers who worked for opioid use disorders health centres (n=22)	OBJECTIVE: Although use of telemedicine for the treatment of opioid use disorders (Tele-ODD) is growing, there is limited research on how it is actually being deployed in treatment. We explored how health centres across the U.S. are using tele-ODD in treatment as well as reasons for non-adoption. METHODS: We used the 2018 SAMHSA Behavioural Health Treatment Services Locator database and literature review to create a sample of community mental health centres and federally qualified health centres with tele-mental health services. From this list of health centres, we used maximum diversity sampling to identify and recruit health centre leaders to participate in semi-structured interviews. We used inductive and deductive approaches to develop site summaries. RESULTS: Twenty-two health centres from 14 different states participated. Of these, 8 offered tele-ODD. Among centres with tele-ODD, medication management was the most common service provided via video. Typically, health centres offered telemedicine visits after an initial, in-person visit with a waived (prescribing) provider. Some programmes only offered counselling via telemedicine. Leading barriers to treatment that tele-ODD programme representatives mentioned included regulations on the prescribing of controlled substances, including buprenorphine, and difficulties in sending lab results to distant (prescribing) providers. Non-adopters reported not offering tele-ODD due to regulations in controlled substance prescribing, complexities and regulatory barriers to offering group visits, and the belief that in-person ODD services were meeting patient need. <u>CONCLUSIONS: Tele-ODD is being deployed in a variety of ways. Describing current delivery models can inform strategies to promote and implement tele-ODD to combat the opioid epidemic.</u>	Journal of Substance Abuse Treatment

Title	Y.	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
Impact of the coronavirus pandemic on substance use disorder treatment: findings from a survey of specialty providers in California	2021	Henretty, K. et al.	Telehealth technology for people with substance addiction treatment	Whether the pandemic curtailed the use of addiction treatment and the extent to which telehealth was able to mitigate access barriers. Focused specifically on provider organisations that served Medicaid beneficiaries.	US	Quantitative (survey)	People who provide speciality addiction treatment (n=133)	Background: As the coronavirus pandemic public health emergency begins to ebb in the United States, policymakers and providers need to evaluate how the addiction treatment system functioned during the public health emergency and draw lessons for future emergencies. One important question is whether the pandemic curtailed the use of addiction treatment and the extent to which telehealth was able to mitigate access barriers. Methods: To begin to answer this question, we conducted a survey of speciality addiction treatment providers in California from June 2020 through July 2020. The survey focused specifically on provider organisations that served Medicaid beneficiaries. Results: Of the 133 respondents, 50% reported a decrease in patients since the stay-at-home order in March 2020, with the largest decline among new patients, and 58% said more patients were relapsing. Eighty-one percent of providers said that telemedicine use had increased since the stay-at-home order. Most said that telemedicine had moderately (48%) or completely (30%) addressed access barriers. <u>Conclusion: More efforts are needed to ensure that patients, and in particular new patients, receive addiction treatment during public health emergencies.</u>	Substance Abuse: Research and Treatment

Title	Y.	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
<b>8. Development of harm reduction information apps</b>									
Acceptability and feasibility of a mobile health application for video directly observed therapy of buprenorphine for opioid use disorders in an office-based setting	2020	Godersky, M. et al.	Mobile health application for video directly observed therapy of buprenorphine in an office-based setting	Piloting and use of a mobile health application for video-DOT of buprenorphine appears feasible and acceptable for patients who are treated in an office-based setting.	US	Quantitative (Self-reported measures and open-ended questions)	People who take buprenorphine in an office-based setting (n=14)	Introduction/background: Video directly observed therapy (video-DOT) through a mobile health platform may improve buprenorphine adherence and decrease diversion. This pilot study tested the acceptability and feasibility of using this technology among patients receiving buprenorphine in an office-based setting. Methods: Participants were instructed to record videos of themselves taking buprenorphine. Data were collected from weekly in-person visits over a 4-week period; assessments included self-report of medication adherence, substance use, satisfaction with treatment and use of the application, and also urine drug testing. Open-ended questions at the final visit solicited feedback on patients' experiences using the mobile health application. Results: The sample consisted of 14 patients; a majority were male (86%) and White (79%). All participants except 1 (93%) were able to use the application successfully to upload videos. Among those who successfully used the application, the percentage of daily videos uploaded per participant ranged from 18% to 96%; on average, daily videos were submitted by participants 72% of the time. Most participants (10/14; 71%) reported being "very satisfied" with the application; of the remaining 4 participants, 2 were "satisfied" and 2 were "neutral." Participants reported liking the accountability and structure of the application provided and its ease of use. Negative feedback included minor discomfort at viewing one's self during recording and the time required. <u>Conclusions: Based on these results, use of a mobile health application for video-DOT of buprenorphine appears feasible and acceptable for patients who are treated in an office-based setting. Further research is needed to test whether use of such an application can improve treatment delivery and health outcomes.</u>	Journal of Addiction Medicine
COVID-19 and opioid use disorder: Expanding treatment access in rural settings	2021	Mumba, M. et al.	Telehealth in treating patients with opioid use disorder	This article examines the evidence supporting the use of telehealth in treating patients with opioid use disorder and explores other promising options that can help overcome pandemic-related barriers to treatment.	Undertaken in US but with an international focus.	Systematic review - 50 papers included	Patients with opioid use disorder	Abstract: Substance use treatment inequities among rural populations are well documented and the COVID-19 pandemic has exacerbated these inequalities, forcing healthcare providers to be creative in the delivery of treatment. Systematic reviews on the use of telehealth to treat patients with substance use disorder indicate that it is a promising alternative to in-person services. This article examines the evidence supporting the use of telehealth in treating patients with opioid use disorder and explores other promising options that can help overcome pandemic-related barriers to treatment.	Nursing
Technologies for opioid use disorder management: mobile app search and scoping review	2020	Nuamah, J. et al.	Opioid-related smartphone applications (apps)	To design OUD management technologies that utilise wearable sensors to provide continuous monitoring capabilities. Analysis of current apps on the market related to OUD.	Undertaken in US but with an international focus.	Mobile Health App Search and scoping review - 18 papers included	People with opioid use disorder	Background: Advances in technology engender the investigation of technological solutions to opioid use disorder (OUD). However, in comparison to chronic disease management, the application of mobile health (mHealth) to OUD has been limited.; Objective: The overarching aim of our research was to design OUD management technologies that utilise wearable sensors to provide continuous monitoring capabilities. The objectives of this study were to (1) document the currently available opioid-related mHealth apps, (2) review past and existing technology solutions that address OUD, and (3) discuss opportunities for technological withdrawal management solutions.; Methods: We used a two-phase parallel search approach: (1) an app search to determine the availability of opioid-related mHealth apps and (2) a scoping review of relevant literature to identify relevant technologies and mHealth apps used to address OUD.; Results: The app search revealed a steady rise in app development, with most apps being clinician-facing. Most of the apps were designed to aid in opioid dose conversion. Despite the availability of these apps, the scoping review found no study that investigated the efficacy of mHealth apps to address OUD.; <u>Conclusions: Our findings highlight a general gap in technological solutions of OUD management and the potential for mHealth apps and wearable sensors to address OUD.</u>	Journal of Medical Internet Research - mHealth and

Title	Y.	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
Review of popularity and quality standards of opioid-related smartphone apps	2020	Vilardaga , R. et al.	Opioid-related smartphone applications (apps)	Characterise the purpose, audience, quality, and popularity of opioid-related smartphone apps.	US	Quantitative (web scraping)	Opioid-related apps analysed (n=61)	<p>PURPOSE OF REVIEW: Opioid misuse, addiction, and related harm is a global crisis that affects public health and social and economic welfare. Many of the strategies being used to combat the opioid crisis could benefit from improved access and dissemination, such as that afforded by smartphone apps. The goal of this study was to characterise the purpose, audience, quality and popularity of opioid-related smartphone apps. Using web scraping, available information from 619 opioid-related apps (e.g., popularity metrics) was downloaded from Google Play, and 59 apps met criteria for review. The apps were additionally coded for quality by two raters using an 8-item screener for the American Psychiatric Association App Evaluation Model. FINDINGS: Sixty one percent of apps targeted patients, 29% providers, 8% the general community, and 2% healthcare trainees. Regarding app purpose, 49% addressed treatment, 27% prevention, and 24% overdose. Only one app met all criteria on the screener for quality, and there was no association between a total score calculated for the screener and measures of app popularity (e.g., star ratings; <math>R(2)=0.10</math>, <math>p=0.19</math>). SUMMARY: Opioid-related apps available for consumers addressed key stakeholders (patients, providers, community) and were consistent with strategies to address the opioid crisis (prevention, treatment, overdose). However, there was little evidence that available opioid-related apps meet basic quality standards, and no relationship was found between app quality and popularity. This review was conducted at the level of consumer decision-making (i.e., the app store), where only a handful of opioid-related apps met quality standards enough to warrant a more detailed evaluation of the app before recommendation for use. Because <u>smartphone apps could be a critical tool to increase access to and utilisation of opioid prevention, treatment, and recovery services, further development and testing is sorely needed.</u></p>	Current Addiction Reports
Smartphone apps targeting alcohol and illicit substance use: systematic search in commercial app stores and critical content analysis	2019	Tofighi , B. et al.	Mobile apps targeting substance use	To evaluate the functionality, aesthetics, and quality of information of free or low-cost apps claiming to target alcohol, benzodiazepine, cocaine, crack/cocaine, crystal methamphetamine, and heroin use using the validated Mobile App Rating Scale (MARS) and critical content analysis.	Undertaken in the US but with an international focus.	Systematic Search (iTunes and Google Play app stores) Qualitative (Critical Content analysis)	People with alcohol and illicit substance use	<p>BACKGROUND: Smartphone apps promise to enhance the reach of evidence-based interventions (cognitive behaviour therapy, contingency management and therapeutic education system) for populations with substance use disorders, with minimal disruption to health systems. However, further studies are needed to systematically evaluate smartphone apps targeting alcohol and illicit substances. OBJECTIVE: The aim of this study was to evaluate the functionality, aesthetics, and quality of information of free or low-cost apps claiming to target alcohol, benzodiazepine, cocaine, crack/cocaine, crystal methamphetamine, and heroin use using the validated Mobile App Rating Scale (MARS) and critical content analysis. METHODS: A systematic search of iTunes and Google Play app stores for free or low-cost apps facilitating recovery was conducted in March 2018 and yielded 904 apps using the keywords described in previous studies (e.g. recovery, sobriety, sober, alcohol, and heroin). An interdisciplinary team of clinicians, behavioural informatics, and public health reviewers trained in substance use disorders conducted a descriptive analysis of 74 apps categorized as reducing use. In addition to the MARS scale, a descriptive analysis of relevant apps was conducted by the study team to assess for quality indicators emphasized by expert guidelines and review articles. RESULTS: Most apps (n=74) claimed to reduce use or promote abstinence and yielded an overall low median MARS score of 2.82 (0.55) and a wide range of scores (1.64, 4.20). Ratings were also low for engagement (2.75 (0.72)), functionality (3.64 (0.78)), aesthetics (3.03 (0.87)), information (2.82 (0.62)), and satisfaction (1.76 (0.67)) subdomains. Innovative design and content features elicited in the review included initial assessments of substance use following app download, tracking substance use, and related consequences (e.g., cost or calorie intake), remote and proximate peer support per geospatial positioning, and allowing users and family members of individuals with substance use disorders to locate 12-step meetings, treatment programmes, and mental health services. Few apps integrated evidence-based psychotherapeutic (e.g., cognitive behavioural therapy [CBT] or motivational interviewing) and pharmacologic interventions (e.g., naloxone or buprenorphine). CONCLUSIONS: <u>Few commercially available apps yielded in our search integrated evidence-based interventions (e.g., extended-release naltrexone, buprenorphine, naloxone, Self-Management and Recovery Training recovery, or CBT), and a concerning number of apps promoted harmful drinking and illicit substance use.</u></p>	Journal of Medical Internet Research - mHealth and U uHealth

Title	Y.	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
<b>9. Development of overdose prevention technology</b>									
Realize, analyse, engage (RAE): A digital tool to support recovery from substance use disorder	2021	Kerreiro, et al.	A wearable sensor for continuous monitoring of stress and craving detection with real-time mobile interventions	Two-part study with a qualitative and quantitative exploration of a wearable device. The second phase of the study will be a randomised controlled trial of RAE vs usual care to evaluate rates of return to use, retention in treatment, and quality of life.	US	Quantitative (biometric data captured through the wearable sensor and analysed) and Qualitative (interviews and focus groups)	Participants in outpatient treatment for substance use disorders using the RAE system for 30 days (n=50)	Background: Substance use disorders are a highly prevalent group of chronic diseases with devastating individual and public health consequences. Current treatment strategies suffer from high rates of relapse, or return to drug use, and novel solutions are desperately needed. Realize Analyse Engage (RAE) is a digital, mHealth intervention that focusses on real time, objective detection of high-risk events (stress and drug craving) to deploy just-in-time supportive interventions. The present study aims to (1) evaluate the accuracy and usability of the RAE system and (2) evaluate the impact of RAE on patient centred outcomes. Methods: The first phase of the study will be an observational trial of N = 50 participants in outpatient treatment for SUD using the RAE system for 30 days. Accuracy of craving and stress detection algorithms will be evaluated, and usability of RAE will be explored via semi-structured interviews with participants and focus groups with SUD treatment clinicians. The second phase of the study will be a randomised controlled trial of RAE vs usual care to evaluate rates of return to use, retention in treatment, and quality of life. Anticipated findings and future directions: The RAE platform is a potentially powerful tool to de-escalate stress and craving outside of the clinical milieu, and to connect with a support system needed most. <u>RAE also aims to provide clinicians with actionable insight to understand patients' level of risk, and contextual clues for their triggers in order to provide more personalized recovery support.</u>	Journal of Psychiatry and Brain Science
Evaluation of a digital health initiative in illicit substance use: cross-sectional survey study	2021	Kershaw, S. et al.	Evaluation of 'Cracks in the Ice (CITI)' community toolkit (digital health initiative for people who use crystal methamphetamine)	CITI is achieving its aim of disseminating evidence-based, non-stigmatizing, and useful information and resources about crystal methamphetamine to key end-user groups and has received good usability scores across its target groups.	Australia	Quantitative (survey)	People who use crystal methamphetamine (n=2125)	Background: The Cracks in the Ice (CITI) community toolkit was developed to provide evidence-based, up-to-date information and resources about crystal methamphetamine to Australians. Given the high rates of internet use in the community and the potential for misinformation, CITI has the potential to play an important role in improving knowledge and challenging misconceptions surrounding crystal methamphetamine. Objective: This study aims to determine (1) whether the CITI toolkit is achieving its aim of disseminating evidence-based information and resources to people who use crystal methamphetamine, their family and friends, health professionals, and the general community and (2) examine the association between the use of CITI and the knowledge and attitudes about crystal methamphetamine. Methods: A cross-sectional web-based survey, open to Australian residents (aged ≥18 years), was conducted from November 2018 to March 2019. People who had previously visited the website (referred to as "website visitors" in this study) and those who had not ("naïve") were recruited. At baseline, knowledge, attitudes, and demographics were assessed. CITI website visitors then completed a series of site evaluation questions, including the System Usability Scale (SUS), and naïve participants were asked to undertake a guided site tour of a replicated version of the site before completing the evaluation questions and repeating knowledge and attitude scales. Results: Of a total 2108 participants, 564 (26.7%) reported lifetime use of crystal methamphetamine, 434 (20.6%) were family/friends, 288 (13.7%) were health professionals, and 822 (38.9%) were community members. The average SUS score was 73.49 (SD 13.30), indicating good site usability. Health professionals reported significantly higher SUS scores than community members (P=.02) and people who used crystal methamphetamine (P<.001). Website visitors had significantly higher baseline knowledge than naïve participants (P<.001). Among naïve participants, knowledge scores increased following exposure to the website (mean 15.2, SE 0.05) compared to baseline (mean 14.4, SE 0.05; P<.001). The largest shifts in knowledge were observed for items related to prevalence, legal issues, and the effects of the drug. Stigmatizing attitude scores among the naïve group were significantly lower following exposure to CITI (mean 41.97, SE 0.21) compared to baseline (mean 44.3, SE 0.21; P<.001). <u>Conclusions: This study provides an innovative evaluation of a national eHealth resource. CITI is achieving its aim of disseminating evidence-based, non-stigmatizing, and useful information and resources about crystal methamphetamine to key end user groups and has received good usability scores across its target groups. Interaction with CITI led to immediate improvements in knowledge about crystal methamphetamine and a decrease in stigmatizing attitudes. CITI demonstrates the important role of digital information and support platforms for translating evidence into practice and improving knowledge and reducing stigma.</u>	Journal of Medical Internet Research
Wearable and wireless mHealth technologies for substance use disorder	2020	Goldfine, C. et al.	Wireless technologies and wearable sensors for the treatment of substance use disorder	To evaluate the advances in wearable and other wireless mobile health (mHealth) technologies in the treatment of substance use disorders.	Undertaken in US but with an international focus.	Scoping review - 28 papers included	People with substance use disorder	Purpose of Review: The goal of this scoping review is to evaluate the advances in wearable and other wireless mobile health (mHealth) technologies in the treatment of substance use disorders.; Recent Findings: There are a variety of wireless technologies under investigation for the treatment of substance use disorder. Wearable sensors are the most commonly used technology. They can be used to decrease heavy substance use, mitigate factors related to relapse, and monitor for overdose. New technologies pose distinct advantages over traditional therapies by increasing geographic availability and continuously providing feedback and monitoring while remaining relatively non-invasive.; Summary: Wearable and novel technologies are important to the evolving landscape of substance use treatment. As technologies continue to develop and show efficacy, they should be incorporated into multifactorial treatment plans.	Current Addiction Reports

Title	Y.	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
A smartphone app intervention for adult cannabis users wanting to quit or reduce their use: a pilot evaluation	2019	Albertella , L. et al.	Smartphone applications (apps) for people who want to reduce/stop using cannabis	Evaluated the feasibility and acceptability of a smartphone app intervention (called Assess, Plan, Track, and Tips [APTT]) for cannabis users wanting to reduce their use.	Australia	Quantitative (piloting an app and four online assessments -survey)	People who use cannabis (n=123)	BACKGROUND: Smartphone applications (apps) offer a promising alternative to face-to-face treatment due to their ease of access and convenience. However, there is a lack of evidence-based apps for cannabis users wishing to reduce their use. OBJECTIVES: The current study evaluated the feasibility and acceptability of a smartphone app intervention (called Assess, Plan, Track, and Tips [APTT]) for cannabis users wanting to reduce their use. METHOD: The current study included 111 cannabis users (68% male, aged 18-50yrs) who had used cannabis in the past month, we're not currently in treatment, and who wanted to reduce/quit their use. Participants were given access to APTT for 1 month. Participants reported on their cannabis use and related problems, confidence in resisting use, severity of dependence, and stage of change at baseline, post-intervention (4 weeks), and at 1-month follow-up. At post-intervention, participants also reported on their usage and satisfaction with the app. RESULTS: The current study found that APTT was acceptable, with over 40% of participants using the app over 20 times over the course of a month. Participants showed a reduction in dependence and cannabis related problems over the course of the study. Further, participants' stage of change at baseline predicted changes in cannabis use. <u>CONCLUSIONS/IMPORTANCE: These findings support the feasibility and acceptability of APTT as an engaging app for cannabis users wishing to better manage their use and support the need for future RCTs to assess the efficacy of mobile-based interventions for cannabis users.</u>	Journal of Cannabis Research
mHealth for the detection and intervention in adolescent and young adult substance use disorder	2018	Carreiro, S. et al.	Wearable and mobile device app-based approaches for the detection and treatment of substance use disorder in adolescents/young adults,	This review article covers the recent literature on wearable and mobile phone app-based approaches for the detection and treatment of SUD in adolescents and young adults.	US	Review (no methods provided)	Young adults (ages 13 - 24) in treatment for substance use disorder	Purpose of Review: The goal of this review is to highlight recent research in mHealth based approaches to the detection and treatment of substance use disorders in adolescents and young adults.; Recent Findings: The main methods for mHealth based detection include mobile phone-based self-report tools, GPS tracking, and wearable sensors. Wearables can be used to detect physiologic changes (e.g., heart rate, electrodermal activity) or biochemical contents of analytes (i.e. alcohol in sweat) with reasonable accuracy, but larger studies are needed. Detection methods have been combined with interventions based on mindfulness, education, incentives/goals and motivation. Few studies have focused specifically on the young adult population, although those that did indicate high rates of utilisation and acceptance.; <u>Summary: Research that explores the pairing of advanced detection methods such as wearables with real time intervention strategies is crucial to realizing the full potential of mHealth in this population.</u>	Current Addiction Reports

Title	Y	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
<b>Other relevant papers</b>									
Inventory and analysis of controlled trials of mobile phone applications targeting substance use disorders: a systematic review	2021	Bahadoor , R. et al.	Mobile phone applications targeting substance use disorders	To describe controlled trials evaluating the effectiveness of smartphone applications targeting substance use disorders and addictive behaviours. Secondly, we aimed to understand how the application produced changes in behaviour and craving management.	France but with an international focus.	Systematic review - 22 papers included	People who use tobacco, alcohol, other substances and binge eating disorder	Background: Less than 20% of people with addictions have access to adequate treatment. Mobile health could improve access to care. No systematic review evaluates effectiveness of mobile health applications for addiction. Objectives: First aim was to describe controlled trials evaluating the effectiveness of smartphone applications targeting substance use disorders and addictive behaviours. Secondly, we aimed to understand how the application produced changes in behaviour and craving management. Method: A systematic review based on PRISMA recommendations was conducted on MEDLINE, CENTRAL, and PsycINFO. Studies had to be controlled trials concerning addictive disorders (substance/behaviour), mobile application-based interventions, assessing effectiveness or impact of those applications upon use, published after 2008. Relevant information was systematically screened for synthesis. Quality and risk of bias were evaluated with JADAD score. Results: Search strategy retrieved 22 articles (2014-2019) corresponding to 22 applications targeting tobacco, alcohol, other substances and binge eating disorder. Control groups had access to usual treatments or a placebo-application or no treatment. Eight applications showed reduced use. Most of the applications informed about risks of use and suggestions for monitoring use. Twelve applications managed craving. Discussion: Heterogeneity limited study comparisons. Duration of studies was too short to predict sustainable results. A reduction of craving seemed related to a reduction in use. <u>Conclusion: There is a lack of robust and comparable studies on mHealth applications for addiction treatment. Such applications could become significant contributors in clinical practice in the future so longer-termed double-blind studies are needed. Targeting craving to prevent relapse should be systematic.</u>	Front Psychiatry
Employing telehealth strategies for opioid addiction during COVID-19: implications for social work health care	2021	Kim, S. H. & Tesmer, O.	Telehealth interventions for people experiencing opioid use	This paper offers a literature review with four themes: (1) a retrospect on pain and opioids, (2) current telehealth models and practical strategies, (3) social work roles and functions in telehealth care, and (4) next steps and implications of telehealth for social work as a much-needed health-care delivery tool at the clinical and community social work practice level.	Undertaken in US but with an international focus.	Literature review - (no detail provided re. methods/number of papers included)	People who use opioids	As the COVID-19 global pandemic continues, more than 40 states have reported increases in opioid-related mortality. The issue of service access and delivery poses a major concern for those struggling with mental illness and substance use disorders in the United States. To ensure the continuity of health care during the pandemic and the co-occurring opioid crisis, the United States continues to adapt its healthcare delivery strategies, which include the introduction of telehealth. Telehealth is a relatively new concept and requires rapid systems changes as well as adjustments from both service providers and recipients. The proper adaptation to the new service delivery method could result in process optimization and improved outcomes for those struggling with opioid dependency. This study aims to bring attention to the opioid crisis that may be overlooked in light of the global pandemic and encourage social workers and other mental health professionals to utilise modern technological advancements to improve service delivery to their clients. <u>This paper offers a literature review with four themes: (1) a retrospect on pain and opioids, (2) current telehealth models and practical strategies, (3) social work roles and functions in telehealth care, and (4) next steps and implications of telehealth for social work as a much-needed health-care delivery tool at the clinical and community social work practice level.</u>	Social Work in Health Care

Title	Y	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
Feasibility and acceptability of a digital health intervention to promote engagement in and adherence to medication for opioid use disorder	2021	Langdon, K. et al.	Digital health intervention to promote engagement and adherence to medication for opioid use disorder	acceptability/feasibility themes: A computer- and text message-based intervention that incorporates a motivational- and distress tolerance-based framework is highly acceptable.	US	Qualitative (semi-structured interviews)	Patients with opioid use disorders engaged in buprenorphine treatment, and endorsed having access to a cell phone (n=24)	Background: Buprenorphine-naloxone is an evidence-based treatment for opioid use disorder (OUD). Despite its efficacy, nearly half of patients discontinue treatment prematurely. Novel intervention strategies that may be delivered outside of traditional treatment settings are needed to support buprenorphine uptake and maintenance. The goal of this study was to elucidate key elements surrounding the acceptability/feasibility and structure of an interactive computer- and text message-delivered personalized feedback intervention for adults initiating outpatient buprenorphine treatment. Methods: Twenty-four adults engaged in treatment at two outpatient addiction treatment centres completed semi structured interviews exploring preferences around digital health interventions. Trained interviewers conducted interviews, the study audio-recorded them, and a professional agency transcribed them verbatim. The research team iteratively developed a coding structure using thematic and content analysis and entered it into a framework matrix. The team double coded each transcript. Results: The sample was balanced by gender, primary type of opioid use (prescription pills; heroin/fentanyl), and phase of recovery [early (≤8 weeks of treatment) vs. late (>8 weeks of treatment)]. The study reached saturation after 24 interviews (mean age = 38.9; 70.8% white; 8.3% Hispanic/Latino). (1) Acceptability/feasibility themes: A computer- and text message-based intervention that incorporates a motivational- and distress tolerance-based framework is highly acceptable. Presentation of material, including the length of the intervention, is effective in facilitating learning. The centre should offer the intervention to individuals entering treatment and they should have the flexibility to complete the intervention at the centre or in private from their own home. The use of technology for intervention delivery helps to overcome fears of judgment stemming from stigmatizing experiences. (2) Structural themes: The text message intervention should deliver both predetermined (automatic) and on demand messages. Two to three messages per day (morning and early evening), with the option to elicit additional messages as needed, would be ideal. The messages must be personalized. Incorporating multimedia such as emojis, gifs, and links to videos will increase interactivity. <u>Conclusions: Overall, adults engaged in outpatient buprenorphine treatment were receptive to an interactive computer- and text message-delivered personalized feedback intervention to support recovery. Incorporating thematic results on suggested structural changes may increase the usability of this intervention to improve treatment outcomes by reducing illicit opioid use, increasing adherence/retention, and preventing future overdose and other complications of illicit opioid use.</u>	Journal of Substance Abuse Treatment
COVID-19: A catalyst for change in telehealth service delivery for opioid use disorder management	2021	Mehtani, N. et al.	Telehealth (a telephone-based programme) for treatment addiction	We describe the development of the "Addiction Telehealth Programme" (ATP), a telephone based programme to reduce treatment access barriers for people with substance use disorders staying at San Francisco's COVID-19 Isolation and Quarantine (I&Q) sites.	US	Quantitative (descriptive statistics were collected on a case series of patients initiated on buprenorphine at I&Q sites and indicators of feasibility were measured)	People who isolated and quarantined (due to COVID-19) with multiple substance use disorders (n=59)	Background: COVID-19 has exacerbated income inequality, structural racism, and social isolation-issues that drive addiction and have previously manifested in the epidemic of opioid-associated overdose. The co-existence of these epidemics has necessitated care practice changes, including the use of telehealth-based encounters for the diagnosis and management of opioid use disorder (OUD).; Methods: We describe the development of the "Addiction Telehealth Programme" (ATP), a telephone-based programme to reduce treatment access barriers for people with substance use disorders staying at San Francisco's COVID-19 Isolation and Quarantine (I&Q) sites. Telehealth encounters were documented in the electronic medical record and an internal tracking system for the San Francisco Department of Public Health (SFDPH) COVID-19 Containment Response. Descriptive statistics were collected on a case series of patients initiated on buprenorphine at I&Q sites and indicators of feasibility were measured.; Results: Between April 10 and May 25, 2020, ATP consulted on the management of opioid, alcohol, GHB, marijuana, and stimulant use for 59 I&Q site guests. Twelve patients were identified with untreated OUD and newly prescribed buprenorphine. Of these, all were marginally housed, 67% were Black, and 58% had never previously been prescribed medications for OUD. Four self-directed early discharge from I&Q-1 prior to and 3 after initiating buprenorphine. Of the remaining 8 patients, 7 reported continuing to take buprenorphine at the time of I&Q discharge and 1 discontinued. No patients started on buprenorphine sustained significant adverse effects, required emergency care, or experienced overdose; <u>Conclusions: ATP demonstrates the feasibility of telephone-based management of OUD among a highly marginalized patient population in San Francisco and supports the implementation of similar programmes in areas of the U.S. where access to addiction treatment is limited. Legal changes permitting the prescribing of buprenorphine via telehealth without the requirement of an in-person visit should persist beyond the COVID-19 public health emergency.</u>	Journal of Substance Abuse Treatment

Title	Y	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
Impacts of COVID-19 on residential treatment programs for substance use disorder	2021	Pagano, A. et al.	No intervention	How residential SUD treatment programmes are impacted by the COVID-19 pandemic.	US	Qualitative (interviews)	People who provide services to those with substance use disorders (n=17)	Introduction: The COVID-19 pandemic may present special challenges for residential substance use disorder (SUD) treatment facilities, which may lack infrastructure and support to implement infection control protocols while maintaining on-site treatment services. However, little is known about how residential SUD treatment programmes are impacted by the COVID-19 pandemic.; Methods: The research team conducted semi-structured interviews with 17 directors of 20 residential SUD treatment programmes across California during the state's shelter-in-place order. The researchers then analysed qualitative interview data thematically and coded them using ATLAS.ti software.; Findings: Thematic analyses identified six major themes: programme-level impacts, staff impacts, client impacts, use of telehealth, programme needs, and positive effects. "Programme-level impacts" were decreased revenue from diminished client censuses and insufficient resources to implement infection control measures. "Staff impacts" included layoffs, furloughs, and increased physical and emotional fatigue. "Client impacts" were delayed treatment initiation; receipt of fewer services while in treatment; lower retention; and economic and psychosocial barriers to community re-entry. "Use of telehealth" included technical and interpersonal challenges associated with telehealth visits. "Programme needs" were personal protective equipment (PPE), stimulus funding, hazard pay, and consistent public health guidance. "Positive effects" of the pandemic response included increased attention to hygiene and health, telehealth expansion, operational improvements, and official recognition of SUD treatment as an essential health care service.; Conclusion: <u>Study findings highlight COVID-related threats to the survival of residential SUD treatment programmes; retention of the SUD treatment workforce; and clients' SUD treatment outcomes. These findings also identify opportunities to improve SUD service delivery and suggest avenues of support for residential SUD treatment facilities during and after the COVID-19 pandemic.</u>	Journal of Substance Abuse Treatment
Understanding eHealth cognitive behavioral therapy targeting substance use: realist review	2021	Shams, F. et al.	Electronic cognitive behavioural therapy (eCBT) for substance use	How do different electronic cognitive behavioural therapy eCBT interventions for substance use interact with different contexts to produce certain outcomes?	Undertaken in Canada but with an international focus.	Systematic review - 54 papers included	People with substance use disorders	Background: There is a growing body of evidence regarding eHealth interventions that target substance use disorders. Development and funding decisions in this area have been challenging, due to a lack of understanding of what parts of an intervention work in which context.; Objective: We conducted a realist review of the literature on electronic cognitive behavioural therapy (eCBT) programmes for substance use with the goal of answering the following realist question: "How do different eCBT interventions for substance use interact with different contexts to produce certain outcomes?"; Methods: A literature search of published and gray literature on eHealth programmes targeting substance use was conducted. After data extraction, in order to conduct a feasible realist review in a timely manner, the scope had to be refined further and, ultimately, only included literature focusing on eCBT programmes targeting substance use. We synthesized the available evidence from the literature into Context-Mechanism-Outcome configurations (CMOCs) in order to better understand when and how programmes work.; Results: A total of 54 papers reporting on 24 programmes were reviewed. Our final results identified eight CMOCs from five unique programmes that met criteria for relevance and rigor. <u>Conclusions: Five strategies that may be applied to future eCBT programmes for substance use are discussed; these strategies may contribute to a better understanding of mechanisms and, ultimately, may help design more effective solutions in the future. Future research on eCBT programmes should try to understand the mechanisms of programme strategies and how they lead to outcomes in different contexts.</u>	Journal of Medical Internet Research
eHealth interventions to treat substance use in pregnancy: a systematic review and meta-analysis	2021	Silang, K. et al.	eHealth interventions for the treatment of substance use disorder during pregnancy	Effectiveness of eHealth interventions for the treatment of substance use during pregnancy.	Undertaken in Canada but with an international focus.	Systematic review and meta-analysis - 6 papers included	Pregnant people experiencing substance use	Substance use during pregnancy is associated with adverse pregnancy and neonatal outcomes; eHealth interventions offer a potential accessible treatment option. The objective of this systematic review and meta-analysis was to evaluate the effectiveness of eHealth interventions for the treatment of substance use during pregnancy. A comprehensive search of PsycINFO, Medline, CINAHL, Cochrane and Embase databases was conducted from May 2020 to April 2021. The protocol for this study was registered with Prospero (CRD42020205186) through the University of York Centre for Reviews and Dissemination. Two independent reviewers completed screening, data extraction, and quality assessment. RCTs were included if they reported: (a) administration of an eHealth intervention for (b) substance use outcomes, among (c) pregnant individuals. Comprehensive Meta-Analysis Software (CMA) was used to calculate pooled effect sizes (Odds Ratio) to determine the effect of eHealth interventions on substance use outcomes. Six studies were identified with substance use outcomes that included: smoking (n = 3), alcohol (n = 2), and other (n = 1). eHealth interventions were delivered through the internet (n = 1), computer (n = 3), telephone (n = 1), and text (n = 1). <u>Results suggested that eHealth interventions significantly reduced substance use in pregnant individuals compared to controls (OR = 1.33, 95% CI = 1.06 to 1.65, p = 0.013). eHealth interventions offer a promising and accessible treatment option to reduce substance use during pregnancy.</u> This work was supported by the generous donors of the Alberta Children's Hospital Foundation, the Canadian Child Health Clinician Scientist Programme (CCHCSP), the Canadian Institute of Health Research and the Fonds.	International Journal of Environmental Research and Public Health

Title	Y	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
Patients' perceptions of telehealth services for outpatient treatment of substance use disorders during the COVID-19 pandemic	2021	Sugarnan, D. et al.	telehealth in an outpatient substance use disorders (SUD) treatment programme	To examined patient perceptions of telehealth in an outpatient substance use disorders (SUD) treatment programme offering individual therapy, group therapy, and medication management.	US	Quantitative (survey)	People who were engaged in outpatient telehealth treatment in alcohol, drug, and addiction treatment programme (ADATP) (n=58)	Background and Objectives: The rapid scale-up of telehealth services for substance use disorders (SUDs) during the COVID-19 pandemic presented a unique opportunity to investigate patient experiences with telehealth. This study examined patient perceptions of telehealth in an outpatient SUD treatment programme offering individual therapy, group therapy, and medication management.; Methods: Two hundred and seventy adults receiving SUD outpatient treatment were eligible to complete a 23-item online survey distributed by clinicians; 58 patients completed/partially completed the survey. Data were summarized with descriptive statistics.; Results: Participants were predominately male, White, and well-educated. The majority (86.2%) were "very satisfied" or "satisfied" with the quality of telehealth care. "Very satisfied" ratings were highest for individual therapy (90%), followed by medication management (75%) and group therapy (58%). Top reasons for liking telehealth included the ability to do it from home (90%) and not needing to spend time commuting (83%). Top reasons for disliking telehealth were not connecting as well with other members in group therapy (28%) and the ability for telehealth to be interrupted at home or work (26%). <u>Discussion and Conclusions: Telehealth visits were a satisfactory treatment modality for most respondents receiving outpatient SUD care, especially those engaging in individual therapy. Challenges remain for telehealth group therapy. Scientific Significance: This is the first study examining patients' perceptions of telehealth for outpatient SUD treatment during the COVID-19 pandemic by treatment service type. Importantly, while many participants found telehealth more accessible than in-person treatment, there was variability with respect to the preferred mode of treatment delivery.</u>	The American Journal on Addictions
The complementarity of drug monitoring programs and health IT for reducing opioid-related mortality and morbidity	2021	Wang, L.	Health information technology (HIT) for prescription drug monitoring programme (PDMP) to reduce opioid-related mortality and morbidity	Whether health information technology (HIT) complements patient prescription data in PDMPs to reduce opioid-related mortality and morbidity.	US	Quantitative (prescription data analysis)	Patients prescribed opioids	In response to the opioid crisis, each US state has implemented a prescription drug monitoring programme (PDMP) to collect data on controlled substances prescribed and dispensed in the state. I study whether health information technology (HIT) complements patient prescription data in PDMPs to reduce opioid-related mortality and morbidity. A novel dataset is constructed that records state policies that integrate PDMP with HIT and facilitate interstate data sharing. Using difference-in-differences models, I find that PDMP-HIT integration policies reduce opioid-related inpatient morbidity. The reductions are substantial in states that established integration without ever mandating the use of a PDMP. A mechanism test suggests that PDMP integration works mainly through the hospital system while a mandate affects legal opioids prescription. The impacts from integration are strongest for the vulnerable groups-middle-aged, low-to middle-income patients, and those with public insurance. <u>There is suggestive evidence that interstate data sharing further complements integration despite not having a significant impact independently. The results are robust to a set of tests using alternative specifications and measures. The total benefits from integration far exceed the associated costs.</u>	Health Economics
Digital recovery networks: Characterizing user participation, engagement, and outcomes of a novel recovery social network smartphone application	2020	Ashford, R. D. et al.	Sober Grid (a social network) app for recovery from substance use disorder	De-identified individual user data from Sober Grid, a recovery social network site (R-SNS) smartphone application, for the years 2015–2018 was analysed to identify the demographics, engagement patterns, and recovery outcomes of active users.	US	Quantitative (social network analysis)	People with substance use disorder who use Sober Grid app for recovery (n=1273)	BACKGROUND: Recovery support services, including in vivo (i.e., face to face) peer-based supports and social networks, are associated with positive effects on substance use disorder recovery outcomes. The translation of in vivo supports to digital platforms is a recent development that is mostly unexamined. The types of users and their engagement patterns of digital recovery support services (D-RSS), and the utility of objective and self-report data in predicting future recovery outcomes require further study to move the recovery support field forward. METHODS: De-identified individual user data from Sober Grid, a recovery social network site (R-SNS) smartphone application, for the years 2015-2018 was analysed to identify the demographics, engagement patterns, and recovery outcomes of active users. Analysis of variance (ANOVA) tests were used to examine between generational group differences on activity variables and recovery outcomes. Logistic and linear regressions were used to identify significant predictors of sobriety length and relapse among users. RESULTS: The most active tercile of users (n = 1273; mAge = 39 years; 62% male) had average sobriety lengths of 195.5 days and had experienced 4.4 relapses on average since sign-up. Users have over 33,000 unilateral and nearly 14,000 bilateral connections. Users generated over 120,000 unique posts, 507,000 comments, 1617,000 likes, 12,900 check-ins, and 593,000 chats during the period of analysis. Recovery outcomes did not vary between generations, though user activity was significantly different between Generations (Millennials, Generation X, and Baby Boomers), with baby boomers and generation X having higher levels of engagement and connection among all activity markers. Logistic regression results revealed gender (female) was associated with a lower likelihood of reporting loneliness or sexual feelings as an emotional trigger. Linear regressions revealed generation, number of unilateral connections, and number of check-ins was associated with sobriety length, while generation and number of check-ins was associated with number of relapses. <u>CONCLUSIONS: Active users of Sober Grid engage in several platform features that provide objective data that can supplement self-report data for analysis of recovery outcomes. Most commonly uses features are those similar to features readily available in open-ecosystem social network sites (e.g., Facebook). Prediction model results suggest that demographic factors (e.g., age, gender) and activity factors (e.g., number of check-ins) may be useful in deploying just-in-time interventions to prevent relapse or offer additional social support. Further empirical examination is needed to identify the utility of such interventions, as well as the mechanisms of support that accompany feature use or engagement with the D-RSS.</u>	Journal of Substance Abuse Treatment

Title	Y	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
Pilot study of a multilevel mobile health app for substance use, sexual risk behaviors, and testing for sexually transmitted infections and HIV among youth: randomized controlled trial	2020	Cordova, D. et al.	the effects of Storytelling 4 Empowerment (S4E) on behaviour change occurs, clinician-youth risk communication, prevention knowledge, and substance use and sexual risk refusal self-efficacy	evaluated the effects of Storytelling 4 Empowerment (S4E), relative to enhanced usual practice, on the potential mechanisms by which behaviour change occurs, namely clinician-youth risk communication, prevention knowledge, and substance use and sexual risk refusal self-efficacy. We also assessed the ability to measure targeted outcomes of past 30-day substance use (i.e., alcohol, tobacco, and other drug use), condom less sex, and alcohol or drug use before sex, as well as the uptake of STI/HIV testing.	US	Quantitative (demographic survey)	Young people (13-21) who had scheduled an appointment with a participating clinician (n=50)	BACKGROUND: Preventing and reducing substance use disorders, sexually transmitted infections (STIs)/HIV, and teen pregnancy, and the associated risk behaviours (ie, substance use and sexual risk behaviours) among youth remain public health priorities in the United States. Equally important is improving the uptake of STI/HIV testing among the youth. Mobile health (mHealth) apps may be a solution to ameliorate these public health concerns; however, few mHealth preventive interventions have demonstrated efficacy in reducing substance use or sexual risk behaviours or improving the uptake of STI/HIV testing among the youth, particularly in clinic settings. OBJECTIVE: This small scale study aimed to examine the feasibility of conducting a pilot randomised controlled trial (RCT). We evaluated the effects of Storytelling 4 Empowerment (S4E), relative to enhanced usual practice, on the potential mechanisms by which behaviour or change occurs, namely clinician youth risk communication, prevention knowledge, and substance use and sexual risk refusal self-efficacy. We also assessed the ability to measure targeted outcomes of past 30day substance use (i.e. alcohol, tobacco, and other drug use), condom-less sex, and alcohol or drug use before sex, as well as the uptake of STI/HIV testing. METHODS: Employing community-based participatory research principles, 50 youths aged 13 to 21 years were recruited from a youth centred community health clinic in Southeast Michigan, randomised sequentially to either S4E or enhanced usual practice, and assessed at baseline, immediately post intervention, and 30 days post-intervention. S4E consists of 3 modules, including alcohol and drug use, tobacco, and STI/HIV. RESULTS: Relative to youth in the enhanced usual practice group, S4E participants demonstrated higher youth clinician risk communication (mean 3.22, SD 1.67) and increases in prevention knowledge (score mean 0.36, SD 0.51) and self-efficacy (score mean 0.16, SD 0.47). In addition, youth in the S4E group showed reductions in the proportions of past 30-day overall substance use (Cohen h=0.71, 95% CI 0.15 to 1.27), as well as past 30day alcohol (Cohen h=0.71, 95% CI 0.15 to 1.27), tobacco (Cohen h=0.17, 95% CI 0.39 to 0.73), and drug use (Cohen h=1.28, 95% CI 0.72 to 1.84). The results also suggest a reduction in the proportion of youths who reported past 30-day condom-less sex (Cohen h=0.18, 95% CI 0.38 to 0.74) and alcohol use before sex (Cohen h=0.44, 95% CI 0.12 to 1.00). Finally, the findings also demonstrated an increase in the proportion of youths who reported STI/HIV testing over time (Cohen h=0.16, 95% CI 0.39 to 0.72). CONCLUSIONS: The findings suggest the feasibility of a small scale pilot RCT. S4E demonstrated shifts in the hypothesized direction, reducing substance use, sexual risk behaviours, and improving the uptake of STI/HIV testing among youth in a clinic setting. The findings suggest that a larger RCT may be warranted.	Journal of Medical Internet Research - mHealth and uHealth
Establishing a telehealth program in primary care for the treatment of opioid use disorder	2020	Coulter, K. & Hintzsche, M.	Telehealth (telephone advice) service for the treatment of opioid use disorder	A literature review of established office-based opioid treatment (OBOT) programmes, state and federal laws, Medicare and reimbursement policies, a telehealth opioid treatment programme was designed for private primary care practice.	Under taken in US	Literature review - 20 papers included (no detail provided) and design an algorithm	Patients with opioid treatment, who are on medication-assisted treatment	Background. More than 130 Americans die from opioid overdose each day. To address the opioid epidemic, opioid treatment programmes are in place to treat substance use disorder. These programmes have seen an influx of patients and are not able to accommodate the number of patients. Primary care practices can help with the crisis by providing an office-based opioid treatment (OBOT) programme. Objective. To describe the necessary steps and considerations to put in place for implementing a telehealth OBOT programme. Establishing a telehealth programme for patients controlled on medication-assisted treatment can improve access to care, improve patient compliance, and redirect the workflow of the family practice. Methods. After a literature review of established OBOT programmes, state and federal laws, Medicare and reimbursement policies, a telehealth opioid treatment programme was designed for private primary care practice. Conclusions. Primary care practices can implement an office-based opioid treatment programme via telehealth to improve workflow and accessibility to care. Implications for Nursing. To offer improved access to care for patients with opioid addiction and seamless workflow in the office-based setting, primary care practices should consider establishing their telehealth OBOT programme based on the following recommendations.	Journal of Doctoral Nursing Practice
Mobile sensing in substance use research: a scoping review	2020	Lauvsnes, A. et al.	Mobile sensor used to make dichotomous inference on ongoing substance use or not	mobile sensing of substance use and relapse in substance use disorders.	Norway but with an international focus.	Scoping review - 6 papers included	People with substance use disorders	Background: Addictive disorders and substance use are significant health challenges worldwide, and relapse is a core component of addictive disorders. The dynamics surrounding relapse and especially the immediate period before it occurs is only partly understood, much due to difficulties collecting reliable and sufficient data from this narrow period. Mobile sensing has been an important way to improve data quality and enhance predictive capabilities for symptom worsening within physical and mental health care, but is less developed within substance use research. Methodology: This scoping review aimed to reviewing the currently available research on mobile sensing of substance use and relapse in substance use disorders. The search was conducted in January 2019 using PubMed and Web of Science. Results: Six articles were identified, all concerning subjects using alcohol. In the studies a range of mobile sensors and derived aggregated features were employed. Data collected through mobile sensing were predominantly used to make dichotomous inference on ongoing substance use or not and in some cases on the quantity of substance intake. Only one of the identified studies predicted later substance use. A range of statistical machine learning techniques was employed. Conclusions: The research on mobile sensing in this field remains scarce. The issues requiring further attention include more research on clinical populations in naturalistic settings, use of a priori knowledge in statistical modeling, focus on prediction of substance use rather than purely identification, and finally research on other substances than alcohol.	Telemedicine and e-Health

Title	Y	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
Short- and long-term effects of digital prevention and treatment interventions for cannabis use reduction: A systematic review and meta-analysis	2019	Boumparis, N. et al.	Digital prevention and treatment interventions for cannabis use	assessed the effects of digital prevention and treatment interventions on Cannabis use reduction in comparison with control conditions.	Under taken in Netherlands but with an international focus.	Systematic review and meta-analysis (no detail provided re. methods/number of papers included)	People who use cannabis	Background: Frequent Cannabis use has been linked to a variety of negative mental, physical, and social consequences. We assessed the effects of digital prevention and treatment interventions on Cannabis use reduction in comparison with control conditions. Methods: Systematic review with two separate meta-analyses. Thirty randomised controlled trials met the inclusion criteria for the review, and 21 were included in the meta-analyses. Primary outcome was self-reported Cannabis use at post-treatment and follow-up. Hedges' g was calculated for all comparisons with non-active control. Risk of bias was examined with the Cochrane risk-of-bias tool. Results: The systematic review included 10 prevention interventions targeting 8138 participants (aged 12 to 20) and 20 treatment interventions targeting 5195 Cannabis users (aged 16 to 40). The meta-analyses showed significantly reduced Cannabis use at post-treatment in the prevention interventions (6 studies, N=2564, g=0.33; 95% CI 0.13 to 0.54, p= 0.001) and in the treatment interventions (17 comparisons, N=3813, g=0.12; 95% CI 0.02 to 0.22, p= 0.02) as compared with controls. The effects of prevention interventions were maintained at follow-ups of up to 12 months (5 comparisons, N=2445, g=0.22; 95% CI 0.12 to 0.33, p < 0.001) but were no longer statistically significant for treatment interventions. <u>Conclusions: Digital prevention and treatment interventions showed small, significant reduction effects on Cannabis use in diverse target populations at post-treatment compared to controls. For prevention interventions, the post-treatment effects were maintained at follow-up &amp; up to 12 months.</u>	Drug and Alcohol Dependence
A systematic review of the effectiveness of digital interventions for illicit substance misuse harm reduction in third-level students	2019	Dick, S. et al.	Digital (web-based or mobile) interventions for illicit substance misuse harm reduction in third-level students	identify and critically appraise studies examining the effectiveness of digital interventions for illicit substance misuse harm reduction in third-level students.	Under taken in Ireland but with an international focus.	Systematic review - 8 papers included	Students with problem substance use	Background: Illicit substance misuse is a growing public health problem, with misuse peaking among 18-25-year-olds, and attendance at third-level education identified as a risk factor. Illicit substance misuse has the potential to harm mental and physical health, social relationships, and impact on academic achievements and future career prospects. Digital interventions have been identified as a vehicle for reaching large student populations and circumventing the limited capacity of student health services for delivering face-to-face interventions. Digital interventions have been developed in the area of alcohol and tobacco harm reduction, reporting some effectiveness, but the evidence for the effectiveness of digital interventions targeting illicit substance misuse is lacking. This review aims to systematically identify and critically appraise studies examining the effectiveness of digital interventions for illicit substance misuse harm reduction in third-level students.; Methods: We systematically searched ten databases in April 2018 using keywords and database specific terms under the pillars of "mHealth," "substance misuse," and "student." To be eligible for inclusion, papers had to present a measure of illicit substance misuse harm reduction. Included articles were critically appraised and included in the qualitative synthesis regardless of quality.; Results: A total of eight studies were included in the qualitative synthesis. Studies reported harm reduction in terms of substance misuse or initiation, as consequences or problems associated with substance misuse, or as correction of perceived social norms. Overall, five out of the eight studies reported at least one positive outcome for harm reduction. The critical appraisal indicated that the study quality was generally weak, predominantly due to a lack of blinding of study participants, and the use of self-reported substance misuse measures. However, results suggest that digital interventions may produce a modest reduction in harm from illicit substance misuse. <u>Conclusions: The results of this review are positive and support the need for further high-quality research in this area, particularly given the success of digital interventions for alcohol and tobacco harm reduction. However, very few studies focused solely on illicit substances, and those that did targeted only marijuana. This suggests the need for further research on the effectiveness of this type of intervention for other illicit substances.</u>	BMC Public Health
Are computer-based treatment programs effective at reducing symptoms of substance misuse and mental health difficulties within adults? a systematic review	2019	Dugdale, S. et al.	Computer-based or Internet-delivered intervention for reducing substance use/mental health problem symptoms	To identify and investigate the efficacy of these computer-based interventions at improving substance misuse and mental health outcomes.	Under taken in the UK but with an international focus.	Systematic review - 33 papers included	People who are experiencing symptoms of problem substance use and mental health difficulties	Objective: Comorbid substance misuse and mental health difficulties are recognised as a leading contributor to disease burden worldwide. Amid cuts to health care services, computer-based interventions may provide support for patients experiencing these difficulties. The aims of this systematic review were to identify and investigate the efficacy of these computer-based interventions at improving substance misuse and mental health outcomes. Methods: A systematic search was conducted of CINAHL Plus, PsycARTICLES, PsycINFO, Medline, Web of Science, and the Cochrane Library. Gray literature was also searched for relevant papers. Data were extracted from 33 papers, which met eligibility criteria by reporting a computer-based intervention designed to treat substance misuse and mental health in adults. Quality assessments were conducted on these papers. Results: Computer-based interventions generally led to an improvement of substance misuse and mental health outcomes within groups and when compared against waitlist control and psychoeducation. Computer-based interventions were effective at improving dual diagnosis outcomes, and improvements to mental health outcomes specifically were maintained for up to nine months. However, the combined effect of computer-based interventions and therapist support was found to be more effective than the effects of computer-based interventions alone. <u>Conclusions: Many papers were limited by high attrition rates commonly attributed to "digital" interventions. Future research should consider systematically recruiting a range of participants, including those potentially affected by the digital divide, and incorporating methods within research to maintain engagement. This review was also limited by the heterogeneity of the papers reported, many of which differed between targeting dual diagnosis and targeting either substance misuse or mental health respectively, with outcomes investigating other difficulties out of curiosity.</u>	Journal of Dual Diagnosis

Title	Y	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
eHealth familias unidas: efficacy trial of an evidence-based intervention adapted for use on the internet with hispanic families	2019	Estrada , Y. et al.	eHealth Familias Unidas, an Internet adaptation of an evidence-based family intervention for Hispanics	To evaluate the efficacy of eHealth Familias Unidas, an Internet adaptation of an evidence-based family intervention for Hispanics.	US	Randomised controlled trial	Hispanic youth with behavioural problems (n=230)	While substance use and sexual risk behaviours among Hispanic youth continue to be public health concerns, few evidence-based preventive interventions are developed for and implemented with Hispanic/Latino youth. The objective of this study was to evaluate the efficacy of eHealth Familias Unidas, an Internet adaptation of an evidence-based family intervention for Hispanics. A randomised controlled trial design (n=230) was used to evaluate intervention effects on substance use and condomless sex among a sample of Hispanic eighth graders with behavioural problems. Participants were randomised to eHealth Familias Unidas (n=113) or prevention as usual (n=117) and assessed at baseline and 3 and 12 months post baseline. We trained mental health school personnel and community mental health professionals to recruit and deliver the Internet-based intervention with Hispanic families. It was hypothesized that, over time, eHealth Familias Unidas would be more efficacious than prevention as usual in reducing drug use (marijuana, cocaine, inhalants, and other drugs), prescription drug use, cigarette use, alcohol use, and condomless sex and that these changes would be mediated by family functioning. Significant intervention effects were found across time for drug use, prescription drug use, and cigarette use. While eHealth Familias Unidas positively affected family functioning, mediation effects were not found. <u>This study demonstrated that family-based eHealth interventions can be efficacious among Hispanic populations when delivered in community settings.</u>	Prevention Science
The utility and impact of the addiction comprehensive health enhancement support system (ACHESS) on substance abuse treatment adherence among youth in an intensive outpatient program	2019	Hussey , D. & Flynn, K.	Use of the digital Addiction Comprehensive Health Enhancement Support System (ACHESS) on substance abuse treatment adherence	to evaluate the utility and impact of (Addiction Comprehensive Health Enhancement Support System) ACHESS on treatment adherence among youth with substance use disorders in an intensive outpatient programme. Piloting by a mobile app.	US	Qualitative (propensity score matching (PSM) based on observation and interviews)	People under 21 years with a substance use disorder who were enrolled in an intensive outpatient programme (n=28)	Youth experiencing substance use disorders often are susceptible to relapse because traditional support systems can be expensive, geographically dispersed, operated on limited schedules and lacking in peer support. The continuity of care offered via the digital Addiction Comprehensive Health Enhancement Support System (ACHESS) system holds promise in preventing relapse because of its portability and capability to foster virtually anytime/anywhere, cost-effective access to supportive interventions. The aim of this mixed-methods study was to evaluate the utility and impact of ACHESS on treatment adherence among youth with substance use disorders in an intensive outpatient programme in the US Midwest. Data on 28 clients using ACHESS during 2016-17 were compared to retrospective data on 28 carefully-matched others treated without ACHESS during 2014-16. Fifty-four percent of the study group successfully completed treatment as opposed to 42.9% of those in the comparison group. Staff focus group findings highlighted how some features of ACHESS were effectively integrated into the care model and appeared to positively impact outcomes, while other elements of the application offered little utility. <u>We suggest further study of ACHESS among larger samples of youth with substance use disorders in intensive outpatient programmes to assess its efficacy in supporting adherence to treatment.</u>	Psychiatry Research
Telemedicine-delivered treatment interventions for substance use disorders: A systematic review	2019	Lin, L. et al.	telemedicine interventions for people with substance use disorders	identified and summarized studies examining the effectiveness of telemedicine interventions to deliver treatment for patients with substance use disorders.	US but with an international focus.	Systematic review - 13 papers included	People with opioid and other substance use disorders	With increased negative impacts from opioid and other substance use disorders in the US, it is important for treatments to not only be effective, but also accessible to patients. Treatment delivery via telemedicine, specifically, the use of videoconferencing, which allows real time communication between a patient and a clinician at a distant site, has been shown to be an effective approach for increasing reach and access to treatments for mental health disorders and other chronic illnesses. This systematic review identified and summarized studies examining the effectiveness of telemedicine interventions to deliver treatment for patients with substance use disorders. Out of 841 manuscripts that met our search criteria, 13 studies met the inclusion criteria. Studies covered interventions for nicotine, alcohol and opioid use disorders. They varied widely in size, quality, and in the comparison groups examined. Studies examined both delivery of psychotherapy and medication treatments. Most studies suggested telemedicine interventions were associated with high patient satisfaction and are an effective alternative, especially when access to treatment is otherwise limited. However, there were substantial methodological limitations to the research conducted to date. <u>Further studies are needed, including larger scale randomised studies that examine different models of telemedicine that can be integrated into existing healthcare delivery settings, to increase the use of effective treatments for patients with substance use disorders.</u>	Journal of Substance Abuse Treatment

Title	Y	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
Consumer health information technology in the prevention of substance abuse: scoping review	2019	Pradhan , A. et al.	Telemedicine interventions to deliver treatment for patients with substance use disorders	To provide a holistic and overarching view of the breadth of research on primary prevention of substance abuse using consumer health information technologies (CHIT) conducted over nearly the past five decades. to map out the changing landscape of CHIT over this period.	US but with an international focus.	Scoping review (no detail provided re. methods/number of papers included)	Patients with problem substance use	Background: Addiction is one of the most rapidly growing epidemics that currently plagues nations around the world. In the United States, it has cost the government more than US \$700 billion a year in terms of health care and other associated costs and is also associated with serious social, physical, and mental consequences. Increasing efforts have been made to tackle this issue at different levels, from primary prevention to rehabilitation across the globe. With the use of digital technology rapidly increasing, an effort to leverage the consumer health information technologies (CHITs) to combat the rising substance abuse epidemic has been underway. CHITs are identified as patient-focused technological platforms aimed to improve patient engagement in health care and aid them in navigating the complex health care system.; Objective: This review aimed to provide a holistic and overarching view of the breadth of research on primary prevention of substance abuse using CHIT conducted over nearly past five decades. It also aimed to map out the changing landscape of CHIT over this period.; Methods: We conducted a scoping review using the Arksey and O'Malley's modified methodological framework. We searched 4 electronic databases (PubMed, Cochrane, Scopus, and EMBASE). Papers were included if the studies addressed the use of CHIT for primary prevention of substance abuse and were published in English between 1809 and 2018. Studies that did not focus solely on primary prevention or assessed additional comorbid conditions were eliminated.; Results: Forty-two papers that met our inclusion criteria were included in the review. These studies were published between 1970 and 2018 and were not restricted by geography, age, race, or sex. The review mapped studies using the most commonly used CHIT platforms for substance abuse prevention from mass media in the 1970s to mobile and social media in 2018. Moreover, 191 studies that were exclusively focused on alcohol prevention were excluded and will be addressed in a separate paper. The studies included had diverse research designs although the majority were randomized controlled trials (RCT) or review papers. Many of the RCTs used interventions based on different behavioural theories such as family interactions, social cognitive theories, and harm-minimization framework.; <u>Conclusions: This review found CHIT platforms to be efficacious and cost-effective in the real-world settings. We also observed a gradual shift in the types and use of CHIT platforms over the past few decades and mapped out their progression. In addition, the review detected a shift in consumer preferences and behaviours from face-to-face interactions to technology-based platforms. However, the studies included in this review only focused on the aspect of primary prevention. Future reviews could assess the effectiveness of platforms for secondary prevention and for prevention of substance abuse among comorbid populations.</u>	Journal of Medical Internet Research
Knowledge and utilization of technology-based interventions for substance use disorders: An exploratory study among health professionals in the European Union	2019	Quaglio, G. et al.	Technology-based interventions for substance use disorders	To determine the level of knowledge, use and perceived efficacy of technology-based interventions (TBIs) in substance use disorders (SUDs), among health professionals across six EU Member States.	France, Germany, Italy, the Netherlands, Poland and the UK	Quantitative (survey)	Health personnel workers in the addiction field across Europe (n=311)	Background: Little is known about the knowledge and use of technology-based interventions (TBIs) by health personnel working in the addiction field across Europe. Methods: An online questionnaire was designed using SurveyMonkey in order to determine the level of knowledge, use and perceived efficacy of TBIs in substance use disorders (SUDs), among health professionals across six EU Member States: Germany, Italy, UK, France, Poland and the Netherlands. The survey was sent to a convenience sample of 1200 addiction experts. Results: Surveyed participants (311, response rate 26%), had a mean professional addiction experience of 17 years; 23% stated to have good knowledge of TBIs, while 12% use them in their clinical practice. Forty-six percent consider TBIs useful in the treatment of addiction, and 44% foresee a significant increase of them in the future. TBIs were considered important for people facing barriers to accessing treatment (63%) and for providing support outside the formal care settings (60%). Lack of technical support (48%), poor infrastructure and equipment (42%), and lack of digital literacy among health workers (38%) were identified as the main obstacles in the diffusion of TBIs. <u>Conclusions: Knowledge and utilisation of TBIs among health workers in drug addiction field is low. Nevertheless, TBIs are perceived as a possible means of facilitation in providing access to treatment, and as therapeutic tools which will become more important in the future. The need to improve training policies, awareness and attitudes towards TBIs among EU health professionals, working in the field of addiction is paramount.</u>	Drugs: Education, Prevention and Policy
Perceived Risks and Benefits in a Text Message Study of Substance Abuse and Sexual Behavior	2018	Bonar, E. et al.	Text message used for substance use and sexual behaviours	Examined perceived risks and benefits of study participation among emerging adults with drug use who completed text message assessments of substance use and sexual behaviours.	US	Quantitative (survey)	Emerging adults who use substances (n=54)	To inform ethical procedures for human subjects research using mobile health (mHealth), we examined perceived risks and benefits of study participation among emerging adults (N =54) with drug use who completed text message assessments of substance use and sexual behaviours. Most participants reported comfort with participation and some reported perceived benefits, such as improved relationships. Perceived risks were infrequently reported, including negative emotions, and legal or financial concerns. <u>In conclusion, participants from a vulnerable population reported few perceived harms of participation in longitudinal mHealth assessments of sensitive behaviours. Researchers should continue characterizing participants' perspectives on ethical aspects of mHealth research.</u>	Ethics and Behaviour

Title	Y	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
Engagement in the Overdose Risk Information (ORION) e-Health tool for opioid overdose prevention and self-efficacy: a preliminary study	2017	Carr <sup>A</sup> , G. et al.	e-health psychoeducational software to assess the overdose risk	To evaluate the short-term impact of an innovative e-health psychoeducational software, the Overdose Risk Information (ORION) tool. The ORION programme provided relevant information to opioid-dependent individuals about the risk of suffering a drug overdose as a result of high risky and dysfunctional behaviours.	UK, Germany, Italy, and Denmark	Quantitative (ORION risk factors analysis)	People seeking treatment for their opioid dependence (n=194)	Increasing awareness of, and information about, overdose risk is an appropriate approach in risk reduction. e-Health technology in substance use disorders is an opportunity to support behavioral changes related to public health concerns. The present study aimed to evaluate the short-term impact of an innovative e-health psychoeducational software, the Overdose Risk Information (ORION) tool. The ORION programme provided relevant information to opioid-dependent individuals about the risk of suffering a drug overdose as a result of high risky and dysfunctional behaviors. Seven aggregate risk factors were identified through a systematic review and their outputs included in a risk estimation model. We recruited 194 opioid-dependent treatment seeking individuals from the United Kingdom, Germany, Italy, and Denmark. All participants were given at study entry, and after their use of the software, the General Self-Efficacy (GSE) Scale. We found comparable pre- and post-ORION administration mean GSE scores (SD), 28.49 (5.50) and 28.32 (5.90), respectively (p=0.297). However, there was an inverse correlation between the number of risk factors and reported levels of self-efficacy (p<0.001). ORION was able to identify individuals who are most in need of reducing their modifiable risk factors with appropriate interventions. However, a one-shot e-health tool cannot influence complex domains such as self-efficacy unless this is used with other effective interventions. <u>Nonetheless, the ORION tool is unique in its style and content of delivery, that is translating risks combination into a clear estimation, and will need further development such as (a) integration in smartphone-based e-health apps and (b) testing in other high-risk populations.</u>	Cyberpsychology, Behaviour and Social Networking
Decision support in addition: The development of an e-health tool to assess and prevent risk of fatal overdose. The ORION Project	2016	Baldacchino, A. et al.	ORION e-health tool aimed in obtaining reliable evaluation of risk	The development of ORION e-health tool underlined the importance of an evidence based intervention aimed in obtaining reliable evaluation of risk. In this article, we report on phase 1 (risk estimation), phase 2 (design), and phase 3 (feasibility) of the ORION project.	UK, Germany, Italy, and Denmark	Quantitative (Delphi consensus process, risk estimation modelling)	Patients seeking treatment for their opioid dependence (n=152)	Background and objective: The application of e-health technology to the field of substance use disorders is at a relatively early stage, and methodological quality is still variable. Few have explored the extent of utilisation of communication technology in exploring risk perception by patients enrolled in substance abuse services. The Overdose Risk Information (ORION) project is a European Commission funded programme, aimed to develop and pilot an e-health psycho-educational tool to provide information to drug using individuals about the risks of suffering a drug overdose. Methods: In this article, we report on phase 1 (risk estimation), phase 2 (design), and phase 3 (feasibility) of the ORION project. Results: The development of ORION e-health tool underlined the importance of an evidence based intervention aimed in obtaining reliable evaluation of risk. The ORION tool supported a decision making process aimed at influencing the substance users' self-efficacy and the degree to which the substance users' understand risk factors. Therefore, its innovative power consisted in translating risks combination into a clear estimation for the user who will then appear more likely to be interested in his/her risk perception. <u>Conclusion: Exploratory field testing and validation confirmed the next stage of evaluation, namely, collection of routine patient samples in study clinics. The associations between risk perception of overdose, engagement with the ORION tool and willingness to alter overdose risk factors, in a clinical setting across various EU member states will further confirm the ORION tool's generalisability and effectiveness.</u>	Computer Methods and Programmes in Biomedicine
The effectiveness of telephone counselling in the treatment of illicit drug and alcohol use concerns	2016	Gates, P. & Albertella, L.	telehealth (telephone counselling) for the treatment of illicit drug or alcohol use	Review of the literature on the use of telephone counselling for the treatment of illicit drug or alcohol use.	Undertaken in Australia but with an international focus	Systematic review - 94 papers included	People with problem substance use	Introduction: Technology-assisted substance use interventions such as 'high-tech' internet-based treatments are thought to be effective; however, the relatively 'low-tech' use of telephone counselling does not yet have an established evidence base. This paper reviews the literature including articles with information on the use of telephone counselling for the treatment of illicit drug or alcohol use. Methods: A systematic literature search using a set of telephone counselling and substance-related terms was conducted across four electronic databases. English studies prior to June 2014 that involved the use of telephone counselling with the treatment of illicit drug or alcohol use as a primary or secondary outcome were included. Review papers, opinion pieces, letters or editorials, case studies, published abstracts, and posters were excluded. In all, 94 publications were included in the review. <u>Results and discussion: The literature was supportive of telephone counselling for the treatment of alcohol use in the short term; however, literature regarding illicit drug use was particularly scarce. The generalisability of findings was limited by evident methodological issues in the included studies.</u>	Journal of Telemedicine and Telecare

Title	Y	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
Implementing an mHealth system for substance use disorders in primary care: a mixed methods study of clinicians' initial expectations and first year experiences	2016	Mares, M. et al.	mHealth (smartphone app) to support care for patients with substance use disorders	To examine three FQHCs' implementation of Seva, a smart-phone app (an mHealth system designed to support care for patients with substance use disorders) that offers patients online support/discussion, health-tracking, and tools for coping with cravings, and offers clinicians information about patients' health tracking and relapses. We examined (a) clinicians' initial perspectives about implementing Seva, and (b) the first year of implementation.	US	Qualitative (interviews, meetings and focus groups)	Clinicians working with patients with substance use disorders (n=53)	Background: Millions of Americans need but don't receive treatment for substance use, and evidence suggests that addiction-focused interventions on smart phones could support their recovery. There is little research on implementation of addiction-related interventions in primary care, particularly in Federally Qualified Health Centres (FQHCs) that provide primary care to underserved populations. We used mixed methods to examine three FQHCs' implementation of Seva, a smart-phone app that offers patients online support/discussion, health-tracking, and tools for coping with cravings, and offers clinicians information about patients' health tracking and relapses. We examined (a) clinicians' initial perspectives about implementing Seva, and (b) the first year of implementation at Site 1. Methods: Prior to staggered implementation at three FQHCs (Midwest city in WI vs. rural town in MT vs. metropolitan NY), interviews, meetings, and focus groups were conducted with 53 clinicians to identify core themes of initial expectations about implementation. One year into implementation at Site 1, clinicians there were re-interviewed. Their reports were supplemented by quantitative data on clinician and patient use of Seva. Results: Clinicians anticipated that Seva could help patients and make behavioural health appointments more efficient, but they were sceptical that physicians would engage with Seva (given high caseloads), and they were uncertain whether patients would use Seva. They were concerned about legal obligations for monitoring patients' interactions online, including possible "cries for help" or inappropriate interactions. One year later at Site 1, behavioural health care providers, rather than physicians, had incorporated Seva into patient care, primarily by discussing it during appointments. Given workflow/load concerns, only a few key clinicians monitored health tracking/relapses and prompted outreach when needed; two researchers monitored the discussion board and alerted the clinic as needed. Clinician turnover/leave complicated this approach. Contrary to clinicians' initial concerns, patients showed sustained, mutually supportive use of Seva, with few instances of misuse. <u>Conclusions: Results suggest the value of (a) focusing implementation on behavioural health care providers rather than physicians, (b) assigning a few individuals (not necessarily clinicians) to monitor health tracking, relapses, and the discussion board, (c) anticipating turnover/leave and having designated replacements. Patients showed sustained, positive use of Seva.</u>	BMC Medical Informatics and Decision Making
Utilizing mHealth methods to identify patterns of high risk illicit drug use	2015	Linas, B. et al.	m-health (mobile) for analysis of usage of drugs	Participants of the Exposure Assessment in Current Time (EXACT) study were provided a mobile device for assessment of their daily drug use (heroin, cocaine or both), mood and social context for 30 days.	US	Quantitative (survey)	People who use drugs (n=109)	Introduction: We assessed patterns of illicit drug use using mobile health (mHealth) methods and subsequent health care indicators among drug users in Baltimore, MD. Methods: Participants of the Exposure Assessment in Current Time (EXACT) study were provided a mobile device for assessment of their daily drug use (heroin, cocaine or both), mood and social context for 30days from November 2008 through May 2013. Real-time, self-reported drug use events were summed for individuals by day. Drug use risk was assessed through growth mixture modelling. Latent class regression examined the association of mHealth-defined risk groups with indicators of healthcare access and utilisation. Results: 109 participants were a median of 48.5 years old, 90% African American, 52% male and 59%HIV-infected. Growth mixture modelling identified three distinct classes: low intensity drug use (25%), moderate intensity drug use (65%) and high intensity drug use (10%). Compared to low intensity drug users, high intensity users were younger, injected greater than once per day, and shared needles. At the subsequent study visit, high intensity drug users were nine times less likely to be medically insured (adjusted OR: 0.10, 95%CI: 0.01–0.88) and at greater risk for failing to attend any outpatient appointments (aOR: 0.13, 95%CI: 0.02–0.85) relative to low intensity drug users. <u>Conclusions: Real-time assessment of drug use and novel methods of describing sub-classes of drug users uncovered individuals with higher-risk behaviour who were poorly utilising healthcare services. mHealth holds promise for identifying individuals engaging in high-risk behaviours and delivering real-time interventions to improve care outcomes.</u>	Drug and Alcohol Dependence
Capturing illicit drug use where and when it happens: an ecological momentary assessment of the social, physical and activity environment of using versus craving illicit drugs (70)	2015	Linas, B. et al.	m-health (mobile) for analysis of usage of versus craving illicit drugs	To understand the environmental and contextual influences of illicit cocaine and heroin use and craving using mobile health (mHealth) methods. Design Interactive mHealth methods of ecological momentary assessment (EMA) were utilised in the Exposure Assessment in Current Time (EXACT) study.	US	Quantitative (survey)	People who use drugs (n=109)	Aims: To understand the environmental and contextual influences of illicit cocaine and heroin use and craving using mobile health (mHealth) methods. Design Interactive mHealth methods of ecological momentary assessment (EMA) were utilised in the Exposure Assessment in Current Time (EXACT) study to assess drug use and craving among urban drug users in real-time. Participants were provided with mobile devices and asked to self-report every time they either craved (without using) or used heroin or cocaine for 30 days from November 2008 through May 2013. Setting Baltimore, MD, USA. Participants: A total of 109 participants from the AIDS Linked to the Intra Venous Experience (ALIVE) study. Measurements For each drug use or craving event, participants answered questions concerning their drug use, current mood and their social, physical and activity environments. Odds ratios (OR) of drug use versus craving were obtained from logistic regression models with generalized estimating equations of all reported events. Findings: Participants were a median of 48.5 years old, 90% African American, 52% male and 59% HIV infected. Participants were significantly more likely to report use rather than craving drugs if they were with someone who was using drugs [adjusted odds ratio (aOR) = 1.45, 95% confidence interval (CI) = 1.13, 1.86], in an abandoned space (aOR = 6.65, 95% CI = 1.78, 24.84) or walking /wandering (aOR = 1.68, 95% CI = 1.11, 2.54). Craving drugs was associated with being with a child (aOR = 0.26, 95% CI = 0.12, 0.59), eating (aOR = 0.54, 95% CI = 0.34, 0.85) or being at the doctor's office (aOR = 0.31, 95% CI = 0.12, 0.80). <u>Conclusions: There are distinct drug-using and craving environments among urban drug users, which may provide a framework for developing real-time context-sensitive interventions.</u>	Addiction

Title	Y	Authors	Intervention	Focus (i.e. summary of topic)	Country	Method	Participants	Abstract	J.
Using technology in the delivery of mental health and substance abuse treatment in rural communities: a review	2013	Benavides-Vaello, S. et al.	Telecommunication technology for Delivery of Mental Health and Substance Abuse Treatment in Rural Communities	To explore the advances and uses of telecommunications technology, and related issues, in the delivery of mental health and substance abuse treatment services within rural areas.	US but with an international focus.	Review of literature (semi-systematic) - 38 papers included	People in problem substance use and mental health treatment in rural communities	Rural communities face tremendous challenges in accessing mental health and substance abuse treatment services. Some of the most promising advancements in the delivery of rural health care services have been in the area of telecommunication technology. These applications have the potential to reduce the disparities in the delivery of substance abuse and mental health services between urban and rural communities. The purpose of this inquiry was to explore the advances and uses of telecommunications technology, and related issues, in the delivery of mental health and substance abuse treatment services within rural areas. A review of the academic literature and other relevant works was conducted and the content was organised into four major themes: <u>(a) advantages of telehealth and applications to rural practice, (b) barriers to implementation in rural practice, (c) utilisation in rural areas, and (d) areas for further research.</u>	The Journal of Behavioural Health Services and Research
Development of an in-home telehealth program for outpatient veterans with substance use disorders	2013	Santa Ana, E. et al.	Telehealth management programme for substance use disorder	Describes the development of a Substance Use Disorder telehealth management programme (SUD programme) for use on this device and a feasibility pilot of the programme with six outpatient veterans with substance use disorders referred by their primary medical care providers.	US	Qualitative (semi-structured interviews)	People diagnosed with substance use disorder (n=6)	A variety of obstacles (e.g., lack of transportation, less availability of treatment in rural districts) contribute to underutilisation of treatment among patients with substance use disorders, warranting the need to develop innovative strategies for enhancing access to treatment for these patients. The telehealth in-home-messaging-device is a small message-delivering and monitoring device connected via landline phone to a secure server that provides assessment and disease self-management education to patients in their homes. We describe the development of a Substance Use Disorder telehealth management programme (SUD programme) for use on this device and a feasibility pilot of the programme with six outpatient veterans with substance use disorders referred by their primary medical care providers. These patients indicated that the SUD programme was acceptable, easy to use, and helpful toward addressing their substance use problems. <u>Home telehealth technology may be an innovative and feasible approach for providing substance abuse evidence-based treatment either as an adjunct to speciality treatment for substance use disorders or as a stand-alone intervention within primary care for a larger number of patients who may otherwise not access traditional treatment services.</u>	Psychological Services

## Appendix 2. Grey literature summary<sup>3</sup>

ID	Authors/organisation	Date	Country	Title	Summary	URL
1	European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)	2018	Luxembourg	m-Health applications for responding to drug use and associated harms (report).	This scoping study focused on the applications that are available from well-known app stores in relation to drug use information. Providing people who use drugs with information at their fingertips on harm reduction, safe use, effects of drugs or help available has life-saving potential.	<a href="https://www.emcdda.europa.eu/system/files/publications/10244/EMCDDA%20Papers_m-Health%20applications_Final.pdf">https://www.emcdda.europa.eu/system/files/publications/10244/EMCDDA%20Papers_m-Health%20applications_Final.pdf</a>
2	Lemos&Crane	2013	UK	The potential for empowering homeless people through digital technology: A preliminary literature review (report).	This literature review highlights evidence of the digital empowerment that technology provides people experiencing homelessness. Digital inclusion seeds greater self-esteem, provides security, access to education and security, independence, means of communication and a voice within society. Ensuring digital inclusion for people experiencing homelessness offers a sense of wellbeing and value, which in turn may well assist in the remedy or partial improvement in some or many aspects of a chaotic lifestyle.	<a href="https://www.lemosandcrane.co.uk/resources/LemosandCraneDigitalEmpowerment.pdf">https://www.lemosandcrane.co.uk/resources/LemosandCraneDigitalEmpowerment.pdf</a>
3	Dorney-Smith, S. & Gill, G. (Pathways)	2017	UK	Improving digital health access for excluded groups (report).	This mixed methods study involved people experiencing homelessness, recruited from day centres and hostels. Focus groups (n=38, 5 in total) and surveys (n=90) were conducted to investigate interaction with and exclusion from digital mediums. Although enthusiastic, around 1/3 reported digital exclusion affecting motivation, skills, access and fear of the unknown. Training library and hostel staff to support people experiencing homelessness by providing and improving Wi-	<a href="https://www.pathway.org.uk/publication/improving-digital-health-access-for-excluded-groups/">https://www.pathway.org.uk/publication/improving-digital-health-access-for-excluded-groups/</a>

### <sup>3</sup> Key

Specifically about digital inclusion and people who use drugs
Relevant to PWUD (e.g. homelessness)
Less related to PWUD but somewhat relevant

ID	Authors/organisation	Date	Country	Title	Summary	URL
					Fi, providing a directory of free Wi-Fi, promoting online resources and sexual health and GP referral for recycled laptops and mobile devices were all recommended.	
4	Dorney-Smith, S. et al. (Pathways)	2017	UK	Digital health inclusion for people who have experienced homelessness: Is this a realistic aspiration? (report).	This report summarises the findings of a small study with people experiencing homelessness (same as reported above). Of the 1/3 who were digitally inactive, lack of confidence, skills, self-esteem, ability to read and write and motivation were all highlighted as barriers. Additional access obstacles included lack of data, funds, device and security issues. There was a great deal of enthusiasm for digital health with access to GPs, sexual and mental health, patients' records and support groups online.	<a href="https://www.pathway.org.uk/wp-content/uploads/2013/05/Digital-Inclusion-Report-Final-for-web.pdf">https://www.pathway.org.uk/wp-content/uploads/2013/05/Digital-Inclusion-Report-Final-for-web.pdf</a>
5	Williams, H. & Whelan, A. (Seaview)	2017	UK	An investigation into access to digital inclusion for healthcare for the homeless population (report).	This report describes a qualitative study which involved interviews with 51 people currently experiencing homelessness and a focus group with an additional 13 individuals. Findings show that while 90% had access to a mobile phone, 1/3 did not have internet access. Barriers described included chaotic lifestyle, cost, access, self-esteem, skills, wellbeing, stigma and motivation. Participants were enthusiastic about digital technology as they value the independence, privacy and inclusion that digital access provides.	<a href="https://amhp.org.uk/app/uploads/2018/11/Digital-Inclusion-and-Homeless-People.pdf">https://amhp.org.uk/app/uploads/2018/11/Digital-Inclusion-and-Homeless-People.pdf</a>
6	GSMA	2019	UK	Accelerating digital inclusion for the underserved in high GDP markets (report).	This report focuses on how best to provide digital access to those who are currently marginalised. Those who are digitally underserved are more likely to experience old age, long-term illness, homelessness, substance use, low income and either traveling or have been through the asylum process. The report focuses on providing digital devices and apps to improve lifestyles for those who are excluded. Reduced isolation, communication access, improved safety	<a href="https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2019/06/Mobile-Enabled-Digital-Inclusion-Report_V7.pdf">https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2019/06/Mobile-Enabled-Digital-Inclusion-Report_V7.pdf</a>

ID	Authors/organisation	Date	Country	Title	Summary	URL
					and connection with others and overall improvements in wellbeing and self-esteem can be seen through increased digital access.	
7	Cook, J. (Homeless Link)	2020	UK	Supporting digital skills in homelessness services: Learning from Reboot UK (blog about Good Things Foundation report).	Using a rapid evidence report, this document presents how community connectors offer to assist and support people experiencing homelessness. People face issues around survival and lack of motivation which take precedent over digital upskilling. Providing support for cheap devices and maps for Wi-Fi hotspots in tandem with peer support, mentoring and one-to-one tailored support can assist digital inclusion.	<a href="https://www.homeless.org.uk/connect/blogs/2020/feb/07/supporting-digital-skills-in-homelessness-services---learning-from-reboot">https://www.homeless.org.uk/connect/blogs/2020/feb/07/supporting-digital-skills-in-homelessness-services---learning-from-reboot</a>
8	Sanders, R. (Iriss)	2020	UK	Digital inclusion, exclusion and participation (report).	This evidence summary illustrates that providing safe and accessible internet usage for everyone is crucial in today's society and the creation of a digital underclass who are excluded through poverty or isolation must be avoided. Young people, children, people experiencing homelessness and those leaving prison crucially require access to connect with society for education, housing, employment and socialising which ensures individual and collective wellbeing.	<a href="https://www.iriss.org.uk/resources/esss-outlines/digital-inclusion-exclusion-and-participation">https://www.iriss.org.uk/resources/esss-outlines/digital-inclusion-exclusion-and-participation</a>
9	European Federation of National Organisations Working with the Homeless (FEANTSA)	2021	Belgium	Digital inclusion for homeless people and homeless service providers: an analysis of benefits, challenges, and solutions (report).	This policy paper discusses access to instant information for people experiencing homelessness on safe spaces, places to eat, sleep, find support, welfare, access services or even Wi-Fi hotspots are crucial. Overcoming obstacles is important, including affordability, user skills, charging stations, lack of trust and lack of motivation.	<a href="https://www.feantsaresearch.org/public/user/Digitalisation_Policy_Paper.pdf">https://www.feantsaresearch.org/public/user/Digitalisation_Policy_Paper.pdf</a>
10	European Federation of National Organisations	2021	Belgium	The digital education action plan 2021-2027: Digital inclusion as a way to enhance social	This action plan promotes supporting people experiencing homelessness and those who are vulnerable through digital inclusion provides avenues to improve overall wellbeing, security and to connect with society. Family homelessness	<a href="https://www.feantsa.org/public/user/Resources/Position_papers/FEANTSA_Statement_Digital_Inclusion_Feb_'21.pdf">https://www.feantsa.org/public/user/Resources/Position_papers/FEANTSA_Statement_Digital_Inclusion_Feb_'21.pdf</a>

ID	Authors/organisation	Date	Country	Title	Summary	URL
	Working with the Homeless (FEANTSA)			inclusion of homeless people (report).	and services for children are supported through access to social workers and health services through digital inclusion.	
11	Good Things Foundation	2021	UK	Doing digital: How it can help improve wellbeing in the homelessness sector (report).	This report provides advice for organisations offering digital support for people experiencing homelessness such as safe office access to PC or laptop, connection and Wi-Fi, education and upskilling. Using peer support and digital mentoring with those who possess lived experience helps to encourage a sense of wellbeing, acknowledgment and inclusion.	<a href="https://www.goodthingsfoundation.org/insights/doing-digital-how-it-can-help-improve-wellbeing-in-the-homelessness-sector/">https://www.goodthingsfoundation.org/insights/doing-digital-how-it-can-help-improve-wellbeing-in-the-homelessness-sector/</a>
12	Lawler, E. & Campbell, S. (Carnegie Trust/Just Economics)	2016	UK	Digital exclusion and technology enabled care in Scotland: A review of the literature on the impact of technology on older and disabled adults (report).	This review of the literature focused on the exclusion of older people and disabled adults to the digital world. These two cohorts are those most likely to require the accessibility and rapid responses available for health and social situations yet are the most digitally excluded. Providing these groups with access to tele-healthcare, smart home technology and monitoring systems would ease the burden on over stretched care services and provide fast and effective solutions for vulnerable groups.	<a href="https://www.justeconomics.co.uk/uploads/reports/just-economics-tec-evaluation.pdf">https://www.justeconomics.co.uk/uploads/reports/just-economics-tec-evaluation.pdf</a>
13	Citizens Advice Scotland	2018	UK	Disconnected: Understanding digital inclusion and improving access (report).	This research involved a survey of over 1200 people who had visited one of the 33 Citizens Advice Bureau offices in Scotland. Almost 1/3 of people who took part did not use the internet or email. There is acute concern around those living in the most deprived areas. They are also those who are least likely to have internet access or use of a computer. Understanding the need for PC access in deprived areas instead of simply mobile phones is crucial. Barriers to use can also include age, skills, cost, access, confidence, homelessness and motivation.	<a href="https://www.cas.org.uk/system/files/publications/cas_disconnected_report.pdf">https://www.cas.org.uk/system/files/publications/cas_disconnected_report.pdf</a>

ID	Authors/organisation	Date	Country	Title	Summary	URL
14	Scottish Government	2019	UK	Scottish household survey 2018: Annual report (report).	Scottish household survey on internet access and the digital divide. Households in the 20% most deprived areas were less likely those in the 20% least deprived areas to have access to the internet. Factors such as age, health, income, perceived security and housing status all influence motivation to be involved and negatively affect the digital divide.	<a href="https://www.gov.scot/publications/scotlands-people-annual-report-results-2018-scottish-household-survey/pages/7/">https://www.gov.scot/publications/scotlands-people-annual-report-results-2018-scottish-household-survey/pages/7/</a>
15	Bowyer, G. (Carnegie Trust)	2019	UK	Switched on: Exploring the challenge of adequate digital access for all children and young people (report).	This report explores the lack of digital access through marginalisation affects young people disproportionately through factors such as health, wellbeing, relationships, education and employment. Digital Access for All works to ensure the availability of technology and connection, affordability, ability to engage with technology and provision for all.	<a href="https://www.carnegieuktrust.org.uk/publications/switched-on/">https://www.carnegieuktrust.org.uk/publications/switched-on/</a>
16	NHS Digital	2019	UK	Digital inclusion guide for health and social care (report).	This guide is designed to help healthcare providers, commissioners and designers ensure that services delivered digitally are as inclusive as possible. It describes how access to digital health information provides those isolated or excluded with support and reassurance around physical and mental wellbeing, long-term condition management and suitable use of urgent care. Those on lower incomes and disadvantaged backgrounds are disproportionately left digitally excluded from the benefits of digital health options.	<a href="https://digital.nhs.uk/about-nhs-digital/our-work/digital-inclusion#download-the-digital-inclusion-guide-for-health-and-social-care">https://digital.nhs.uk/about-nhs-digital/our-work/digital-inclusion#download-the-digital-inclusion-guide-for-health-and-social-care</a>
17	Office for National Statistics	2019	UK	Exploring the UK's digital divide (report).	This report highlights that digital inclusion has improved over the last decade but the 5 million internet non-users are being left behind and are disproportionately affected through loss and lack of earnings, communication, time management and employment opportunities. Range of factors associated with lack of internet use including: being disabled, living alone, lack of skills, confidence, age, prefer social contact, cost, privacy and lack of need.	<a href="https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/articles/exploringtheuksdigitaldivide/2019-03-04">https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/articles/exploringtheuksdigitaldivide/2019-03-04</a>

ID	Authors/organisation	Date	Country	Title	Summary	URL
18	Bowyer, B et al. (Carnegie Trust)	2020	UK	Learning from lockdown: Twelve steps to eliminate digital exclusion (report).	This report describes how being digitally excluded affects access to work, income, healthcare, education, welfare, goods and relationships. The 12 recommendations include ensuring community and library access, working with anti-poverty groups, working with excluded groups and ensuring access for disadvantaged and marginalised people.	<a href="https://www.carnegieuktrust.org.uk/publications/learning-from-lockdown-12-steps-to-eliminate-digital-exclusion/">https://www.carnegieuktrust.org.uk/publications/learning-from-lockdown-12-steps-to-eliminate-digital-exclusion/</a>
19	Cryer, J. (Carnegie Trust)	2020	UK	Accelerating digital: Learning from a digital inclusion accelerator programme (report).	This report discusses factors for a successful digital accelerator programme. Community organisations received funding for high intensity, rapid, digital inclusion projects, primarily with young people. They identified those vulnerable, digitally excluded or marginalised and proactively encouraged education and inclusion.	<a href="https://www.carnegieuktrust.org.uk/publications/accelerating-digital/">https://www.carnegieuktrust.org.uk/publications/accelerating-digital/</a>
20	Halliday, A. (Inspiring Scotland)	2020	UK	Research into digital exclusion in Scotland (report).	This report explores how poverty and deprivation have been driving factors in the digital divide with young people and children in Scotland's deprived areas receiving poorer access to educational opportunities. Scottish Government's rapid response using third sector organisations to help connect through access to facilities including data, mentoring and technology has been crucial.	<a href="https://www.inspiringscotland.org.uk/wp-content/uploads/2020/06/Digital-Exclusion-in-Scotland-final-full-report-1.pdf">https://www.inspiringscotland.org.uk/wp-content/uploads/2020/06/Digital-Exclusion-in-Scotland-final-full-report-1.pdf</a>
21	People Know How	2020	UK	Connect four: Digital inclusion. Preliminary event report (report).	This report describes discussions at an event on tackling digital exclusion. Key recommendations were: linking internet access to public spaces; regulating internet service providers as a basic utility; providing internet to tenants in social housing as part of rent costs; making access to public service websites free of charge with no data/airtime required; running a place-based pilot.	<a href="https://peopleknowhow.org/wp-content/uploads/2020/12/Connect-Four-Digital-Inclusion-Preliminary-Report.pdf">https://peopleknowhow.org/wp-content/uploads/2020/12/Connect-Four-Digital-Inclusion-Preliminary-Report.pdf</a>
22	Youth Link Scotland	2020	UK	The impact of LGBT youth: Scotland's digital	This qualitative research report provides an examination of digital youth work in Scotland for the LGBT community. The study employed online interviews to gather 22 stories to	<a href="https://www.youthlinkscotland.org/media/5686/lgbt-ys-digital-yw-research-report.pdf">https://www.youthlinkscotland.org/media/5686/lgbt-ys-digital-yw-research-report.pdf</a>

ID	Authors/organisation	Date	Country	Title	Summary	URL
				youth work on young people (report).	examine the impact of digital youthwork on the LGBT community. Main benefits were a safe and welcoming space for all to enjoy, as well as reduced isolation and feelings of identity/belonging. Improved wellbeing was reported through support, stability and enjoyment. Personal growth was through confidence, communication and leadership and resilience increased through coping strategies and purpose.	
23	Bowyer, G. et al. (Carnegie Trust)	2021	UK	Closing the digital divide for good: An end to the digital exclusion of children and young people in the UK (report).	This report highlights the importance of utilising COVID-19 pandemic changes to redefine individual and collective digital interactions. Employing and safeguarding a long-term strategy to ensure digital inclusion for children and young people is essential.	<a href="https://www.carnegieuktrust.org.uk/publications/closing-the-digital-divide/">https://www.carnegieuktrust.org.uk/publications/closing-the-digital-divide/</a>
24	Healthcare Improvement Scotland	2021	UK	Rapid response: Digital inclusion in health and care in Scotland (report).	This report summarises information on access to and attitudes towards the use of digital technologies. Those who are most at need of health services, such as older people, those in poverty, with disabilities, experiencing homelessness or poor physical or mental health were also most likely to be digitally excluded. Households in the most deprived areas are 12% less likely to secure satisfactory internet access.	<a href="https://www.healthcareimprovementscotland.org/evidence/rapid_response/rapid_response_03-20.aspx">https://www.healthcareimprovementscotland.org/evidence/rapid_response/rapid_response_03-20.aspx</a>