Does mobile phone text messaging promote adherence to antiretroviral therapy in people with HIV infection?

Antiretroviral therapy (ART) can help people with HIV infection live a longer and healthier life. However, adherence to ART can be difficult because it requires taking medication every day. Text messages sent through mobile phones could improve adherence to ART in people with HIV infection.

Key messages

➔ **Mobile phone text messages compared to standard care improve adherence to ART for up to 12 months.**

➔ **Mobile phone text messages compared to standard care may lead to little or no difference in mortality or loss to follow-up after up to 12 months.**

➔ **Weekly text messages probably improve adherence compared to daily text messages, and interactive text messages probably improve adherence compared to non-interactive text messages.**

➔ **All studies were conducted in low-income countries in Africa.**

Who is this summary for?

People making decisions regarding strategies to improve adherence to antiretroviral therapy

! This summary includes:

– **Key findings** from research based on a systematic review
– **Considerations about the relevance of this research** for low-income countries

✗ Not included:

– Recommendations
– Additional evidence not included in the systematic review
– Detailed descriptions of interventions or their implementation

This summary is based on the following systematic review:

Mbuagbaw L, van der Kop ML, Lester RT, et al. Mobile phone text messages for improving adherence to antiretroviral therapy (ART): an individual patient data meta-analysis of randomised trials. BMJ Open 2013; 3:e003950.

What is a systematic review?

A summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise the relevant research, and to collect and analyse data from the included studies

Glossary of terms used in this report:
www.supportsummaries.org/glossary-of-terms

Background references on this topic:
See back page

Background

HIV affects more than 34 million people worldwide, with a disproportionate share of infections in low-income countries. Antiretroviral therapy (ART) has been available for more than two decades and has contributed to improved longevity and quality of life in people living with HIV infection. However, it can be difficult for people who are on ART to take their daily medication for several reasons. Low-adherence to ART could be associated with drug resistance.

Mobile phones have become increasingly present in recent years and their penetration in low-income countries is very high. The possibility to send text-messages through mobile phones at very low cost makes it a promising tool for the promotion of healthy behaviours, including adherence to ART in people with HIV infection.

About the systematic review underlying this summary

Review objective: To determine whether mobile phone text-messaging is efficacious in enhancing adherence to ART in people with HIV infection.

Types of	What the review authors searched for	What the review authors found
Study designs & Interventions	Randomised trials in which patients receiving ART or their caregivers (for children) were provided with mobile phone text messages to promote adherence to ART	Three randomised trials comparing text messaging to a control condition. In two studies, weekly text messages reminders were compared to standard care. In the other study, short or long text messages, either daily or weekly, were compared to the provision of a cell phone, but without study-related communication.
Participants	Adults or children receiving ART	The studies included adults only
Settings	Any setting	Kenya (2 studies) and Cameroon (1 study)
Outcomes	The primary outcomes were adherence to ART and viral load suppression. The secondary outcomes were quality of life, mortality, losses to follow-up, transfers and withdrawals	All studies reported adherence to ART at 48 or 52 weeks and viral load suppression at 52 weeks. One study reported mortality, losses to follow-up, transfers and withdrawals. One study reported quality of life.

Date of most recent search: This review included three studies, which were the only published studies of which the authors were aware that met their selection criteria up until September 2013.

Limitations: This is a well-conducted review that analysed individual patient data from three randomised trials. However, a systematic search for other relevant studies was not undertaken.

Mbuagbaw L, van der Kop ML, Lester RT, et al. Mobile phone text messages for improving adherence to antiretroviral therapy (ART): an individual patient data meta-analysis of randomised trials. BMJ Open 2013; 3:e003950.

Summary of findings

Two studies conducted in Kenya and one in Cameroon, including 1169 participants overall, evaluated mobile phone text messaging against standard care. One study compared short weekly messages to standard care. The other study compared one of four conditions (short or long messages, sent daily or weekly), and a control condition (provision of a mobile phone without any communication related to the study).

→ **Mobile phone text messages compared to standard care improves adherence to ART for up to 12 months. The certainty of this evidence is high.**

→ **Mobile phone text messages compared to standard care may lead to little or no difference in mortality or loss to follow-up after up to 12 months. The certainty of this evidence is low.**

→ **Weekly text messages probably improve adherence compared to daily text messages and interactive text messages probably improve adherence compared to non-interactive text messages. The certainty of this evidence is moderate.**

→ **Motivational content and the length of the text messages may lead to little or no difference in adherence. The certainty of this evidence is moderate.**

About the certainty of the evidence (GRADE) *

⊕⊕⊕⊕
High: This research provides a very good indication of the likely effect. The likelihood that the effect will be substantially different† is low.

⊕⊕⊕◯
Moderate: This research provides a good indication of the likely effect. The likelihood that the effect will be substantially different† is moderate.

⊕⊕◯◯
Low: This research provides some indication of the likely effect. However, the likelihood that it will be substantially different† is high.

⊕◯◯◯
Very low: This research does not provide a reliable indication of the likely effect. The likelihood that the effect will be substantially different† is very high.

* This is sometimes referred to as 'quality of evidence' or 'confidence in the estimate'.

† Substantially different = a large enough difference that it might affect a decision

See last page for more information.

Mobile phone text messages compared to standard care

People	Patients with HIV infection taking ART
Settings	Kenya and Cameroon
Intervention	Mobile phone text messages (overall)
Comparison	Standard care

Outcomes	Absolute effect*		Relative effect (95% CI)	Certainty of the evidence (GRADE)
	Without text message	**With text message**		
ART adherence **12 months follow-up**	50 per 100	58 per 100	OR 1.38 (1.08 to 1.78)	⊕⊕⊕⊕ High
	Difference: 8 more per 100 (Margin of error: from 2 to 14 more)			
Mortality 12 months follow-up	11 per 100	10 per 100	OR 0.87 (0.52 to 1.43)	⊕⊕◯◯ Low
	Difference: 1 less per 100 (Margin of error: from 5 less to 4 more)			
Loss to follow-up 12 months follow-up	10 per 100	9 per 100	OR 0.87 (0.63 to 1.19)	⊕⊕◯◯ Low
	Difference: 1 less per 100 (Margin of error: from 3 less to 2 more)			

Margin of error = Confidence interval (95% CI)   OR: Odds ratio   GRADE: GRADE Working Group grades of evidence (see above and last page)

* The risk WITHOUT the intervention is based on the baseline risk in one of the included studies.[†] The corresponding risk WITH the intervention (and the 95% confidence interval for the difference) is based on the overall relative effect (the OR and its 95% confidence interval).

[†] Lester RT, Ritva P, Mills EJ, et al. Effects of a mobile phone short message service on antiretroviral treatment adherence in Kenya (WelTel Kenya1): a randomised trial. Lancet 2010; 376: 1838–45

Relevance of the review for low-income countries

→ Findings	▷ Interpretation*
APPLICABILITY	
→ **Three studies, all conducted in low-income countries (Cameroon and Kenya), were included.**	▷ *The findings of this intervention are likely to be applicable in low-income countries with comparable health system structures and prevalence of HIV infection.* ▷ *Factors such as ownership of mobile phones and quality of the telecommunication network need to be considered when assessing the applicability of this intervention.*
EQUITY	
→ **Included studies did not directly address equity.**	▷ *This intervention could increase health inequities, disfavouring people without mobile phone or those living in remote areas (i.e. without mobile phone signal).*
ECONOMIC CONSIDERATIONS	
→ **Included studies did not provide information regarding economic considerations.**	▷ *The costs of acquisition and maintenance of mobile phones, as well as the costs of training people in the use of mobile phones should be considered.*
MONITORING & EVALUATION	
→ **The review identifies four ongoing trials, three of which are conducted in resource-limited settings.**	▷ *There is a need to conduct more studies on mobile phone text-messaging for improving adherence to ART in adolescent populations, and in persons who care for children and infants with HIV.*

*Judgements made by the authors of this summary, not necessarily those of the review authors, based on the findings of the review and consultation with researchers and policymakers in low-income countries. For additional details about how these judgements were made see: www.supportsummaries.org/methods

Additional information

Related literature

Finitsis DJ, Pellowski JA, Johnson BT. Text message intervention designs to promote adherence to antiretroviral therapy (ART): a meta-analysis of randomized controlled trials. PloS One. 2014; 9(2):e88166.

Cochrane Review Group on HIV/AIDS. Electronic reminders for promoting adherence to ART among people living with HIV. Geneva: World Health Organization, 2013. http://apps.who.int/iris/handle/10665/94419

Horvath T, Azman H, Kennedy GE, Rutherford GW. Mobile phone text messaging for promoting adherence to antiretroviral therapy in patients with HIV infection. Cochrane Database Syst Rev 2012; 3: CD009756.

van Velthoven MH, Brusamento S, Majeed A, Car J. Scope and effectiveness of mobile phone messaging for HIV/AIDS care: A systematic review. Psychology, Health & Medicine 2013; 18:182-202.

Anglada-Martinez H, Riu-Viladoms G, Martin-Conde M, et al. Does mHealth increase adherence to medication? Results of a systematic review. International Journal of Clinical Practice. 2014; 69:9-32.

Bärnighausen T, Chaiyachati K, Chimbindi N, et al. Interventions to increase antiretroviral adherence in sub-Saharan Africa: a systematic review of evaluation studies. The Lancet Infectious Diseases 2011; 11:942-51.

Gurol-Urganci I, de Jongh T, Vodopivec-Jamsek V, et al. Mobile phone messaging reminders for attendance at healthcare appointments. Cochrane Database Syst Rev 2013; 12: CD007458.

de Jongh T, Gurol-Urganci I, Vodopivec-Jamsek V, et al. Mobile phone messaging for facilitating self-management of long-term illnesses. Cochrane Database Syst Rev 2012; Issue 12: CD007459.

Vodopivec-Jamsek V, de Jongh T, Gurol-Urganci I, et al. Mobile phone messaging for preventive health care. Cochrane Database Syst Rev 2012; 12: CD007457.

Wei, J., Hollin, I., & Kachnowski, S. A review of the use of mobile phone text messaging in clinical and healthy behaviour interventions. J Telemedicine and Telecare 2011; 17:41-8.

About certainty of the evidence (GRADE)

The "certainty of the evidence" is an assessment of how good an indication the research provides of the likely effect; i.e. the likelihood that the effect will be substantially different from what the research found. By "substantially different" we mean a large enough difference that it might affect a decision. These judgements are made using the GRADE system, and are provided for each outcome. The judgements are based on the study design (randomised trials versus observational studies), factors that reduce the certainty (risk of bias, inconsistency, indirectness, imprecision, and publication bias) and factors that increase the certainty (a large effect, a dose response relationship, and plausible confounding). For each outcome, the certainty of the evidence is rated as high, moderate, low or very low using the definitions on page 3.

For more information about GRADE:
www.supportsummaries.org/grade