Supplementary File 8 – GRADE evidence profiles

Comparison 1.1– SMS intervention vs. inactive control (not containing active SMS component)

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	SMS interventions	inactive controls	Relative (95% CI)	Absolute (95% CI)		
STI/HIV diagnosis (objectively confirmed at ≥12 months)												
1 [1]	randomised trials	not serious	not serious [a]	not serious	very serious [b]	none	9/99 (9.1%)	15/101 (14.9%)	**RR 0.61** (0.28 to 1.34)	**58 fewer per 1,000** (from 107 fewer to 49 more)	⊕⊕◯◯ LOW	CRITICAL
Adverse events - Car accident where participant was driver (self-reported at ≥12 months)												
1 [1]	randomised trials	serious [c]	not serious [a]	serious [d]	very serious [b]	none	2/77 (2.6%)	1/80 (1.3%)	**RR 2.08** (0.19 to 22.45)	**14 more per 1,000** (from 10 fewer to 268 more)	⊕◯◯◯ VERY LOW	CRITICAL
STI/HIV diagnosis (objectively confirmed at <12 months)												
1 [1]	randomised trials	not serious	not serious [a]	not serious	very serious [b]	none	6/82 (7.3%)	3/89 (3.4%)	**RR 2.17** (0.56 to 8.40)	**39 more per 1,000** (from 15 fewer to 249 more)	⊕⊕◯◯ LOW	CRITICAL
STI/HIV diagnosis (self-reported)												
0	No RCT identified										-	CRITICAL

Condom use (self-reported at ≥ 12 months) [e]

3 [1,2,3]	randomised trials	serious [f]	not serious	not serious	serious [g]	none	318	349	**OR 1.10** (0.77 to 1.56)	[insufficient data to generate absolute estimate]	⊕⊕◯◯ LOW	IMPORTANT

Condom use (self-reported at < 12 months)

9 [1,3,4,5,6,7,8,9,10]	randomised trials	serious [h]	not serious	not serious	not serious	none	1144	1163	-	SMD **0.02 higher** (0.09 lower to 0.14 higher)	⊕⊕⊕◯ MODERATE	IMPORTANT

STI/HIV testing (objectively confirmed or self-reported at ≥ 12 months) [i]

2 [1,3]	randomised trials	serious [j]	serious [k]	not serious	serious [l]	none	43/226 (19.0%)	52/266 (19.5%)	**OR 0.86** (0.25 to 2.95)	**23 fewer per 1,000** (from 138 fewer to 222 more)	⊕◯◯◯ VERY LOW	IMPORTANT

STI/HIV testing (objectively confirmed or self-reported at < 12 months)

7 [1,3,4,8,9,11,12]	randomised trials	serious [m]	not serious	not serious	not serious	none	568/1057 (53.7%)	445/1094 (40.7%)	**OR 1.83** (1.41 to 2.36)	**150 more per 1,000** (from 85 more to 211 more)	⊕⊕⊕◯ MODERATE	IMPORTANT

Compliance - took treatment for curable STI

1 [1]	randomised trials	serious [c]	not serious [a]	not serious	very serious [b]	none	18/19 (94.7%)	19/19 (100.0 %)	**RR 0.95** (0.82 to 1.09)	**50 fewer per 1,000** (from 180 fewer to 90 more)	⊕◯◯◯ VERY LOW	IMPORTANT

Compliance - abstinence during treatment of curable STI

1 [1]	randomised trials	serious [c]	not serious [a]	not serious	very serious [b]	none	17/18 (94.4%)	16/19 (84.2%)	**RR 1.12** (0.90 to 1.40)	**101 more per 1,000** (from 84 fewer to 337 more)	⊕◯◯◯ VERY LOW	IMPORTANT

Partner notification

2 [1,13]	randomised trials	serious [c]	serious [n]	serious [o]	serious [l]	none	46/163 (28.2%)	42/173 (24.3%)	**OR 1.04** (0.31 to 3.48)	**7 more per 1,000** (from 152 fewer to 285 more)	⊕◯◯◯ VERY LOW	IMPORTANT

Abstinence (at < 12 months)

2 [4,5]	randomised trials	serious [p]	serious [q]	not serious	very serious [r]	none	30/84 (35.7%)	36/85 (42.4%)	**OR 1.15** (0.22 to 6.01)	**34 more per 1,000** (from 284 fewer to 392 more)	⊕◯◯◯ VERY LOW	IMPORTANT

STI/HIV knowledge (at < 12 months)

4 [3,4,6,9]	randomised trials	serious [s]	not serious	not serious	not serious	none	555	625	-	SMD **0.22 higher** (0.09 higher to 0.36 higher)	⊕⊕⊕◯ MODERATE	IMPORTANT

Condom use self-efficacy/skill (at < 12 months)

2 [4,6]	randomised trials	serious [t]	not serious	not serious	serious [u]	none	200	209	-	SMD **0.24 higher** (0.01 lower to 0.48 higher)	⊕⊕◯◯ LOW	IMPORTANT

CI: Confidence interval; **RR:** Risk ratio; **SMD:** Standardised mean difference, SMD values can be interpreted as small (.20), moderate (0.50), or large (0.8), (Cohen 2013) or as showing an important difference (0.50), (Ryan, Synnot et al. 2016); **OR:** Odds ratio

Explanations

a. Single study

b. Single study (pilot trial with very small number of events)

c. Some concern due to lack of blinding of participants for this self-reported outcome

d. Unclear whether this adverse event is caused by study participation

e. Most pooled studies had unidirectional SMS intervention arms only; For Rokicki 2017, we therefore included the 'unidirectional' arm and not the 'interactive quiz' arm [OR 0.36 (CI 0.13-0.98)]

f. Some concern due to lack of or unclear blinding for this self-reported outcome, high risk of attrition and reporting bias in one study, and risk of recruitment bias in another studies (cluster RCT)

g. Some concern due to relatively low total number of events and relatively wide confidence interval

h. Some concern due to lack of or unclear blinding of participants for this self-reported outcome, attrition and (in one study) risk of reporting and other bias.

i. Only studies identified with self-reported outcome

j. Some concern due to lack of blinding of participants, and (for one study) attrition and reporting bias.

k. Confidence intervals overlap only slightly, direction of effect differs, and substantial statistical heterogeneity

l. Low total number of events, and 95% confidence interval includes both, appreciable benefit and harm

m. Some concern due to lack of or unclear blinding of participants, and high or unclear risk of attrition bias in a few studies and reporting bias in some studies.

n. Moderate statistical heterogeneity and opposing direction of effect

o. One of the two studies measures partner attendance during antenatal-care visit for partner to undergo syphilis testing/treatment

p. Concerns due to lack of or unclear blinding, unclear reporting bias in both studies and due to high risk of attrition bias and unclear selection and other bias in one of the studies

q. Substantial heterogeneity and opposing direction of effect (but both confidence intervals include the 1)

r. Very low number of events, and wide confidence interval that includes a null effect and appreciable benefit or harm

s. Concerns due to lack of blinding and high risk of attrition bias in most studies, and high risk of reporting and other bias in one study

t. Some concern due to lack of or unclear blinding of participants for this self-reported outcome and high risk of attrition bias in one study

u. Relatively wide confidence interval that includes both the null and appreciable benefit

References of included trials

1. C, Free, O, McCarthy, S, French,R, K, Wellings, S, Michie, I, Roberts, al, et. Can text messages increase safer sex behaviours in young people? Intervention development and pilot randomised controlled trial. Health Technology Assessment (Winchester, England); 2016.

2. S, Rokicki, J, Cohen, A, Salomon,J, G, Fink. Impact of a Text-Messaging Program on Adolescent Reproductive Health: A Cluster-Randomized Trial in Ghana. Am J Public Health; 2017.

3. S, Lim,M, S, Hocking,J, K, Aitken,C, K, Fairley,C, L, Jordan, A, Lewis,J, al, et. Impact of text and email messaging on the sexual health of young people: a randomised controlled trial. Journal of Epidemiology & Community Health; 2012.

4. L, Ybarra,M, L, Prescott,T, 2nd, Phillips,G,L, S, Bull,S, T, Parsons,J, B, Mustanski. Pilot RCT Results of an mHealth HIV Prevention Program for Sexual Minority Male Adolescents. Pediatrics; 2017.

5. B, Suffoletto, A, Akers, A, McGinnis,K, J, Calabria, C, Wiesenfeld,H, B, Clark,D. A sex risk reduction text-message program for young adult females discharged from the emergency department. Journal of Adolescent Health; 2013.

6. J, Rinehart,D, S, Leslie, J, Durfee,M, M, Stowell, M, Cox-Martin, T, Thomas-Gale, al, et. Acceptability and Efficacy of a Sexual Health Texting Intervention Designed to Support Adolescent Females. Academic Pediatrics.; 2019.

7. J, Reback,C, B, Fletcher,J, A, Swendeman,D, M, Metzner. Theory-Based Text-Messaging to Reduce Methamphetamine Use and HIV Sexual Risk Behaviors Among Men Who Have Sex with Men: Automated Unidirectional Delivery Outperforms Bidirectional Peer Interactive Delivery. AIDS & Behavior; 2019.

8. K, Govender, S, Beckett, W, Masebo, C, Braga, P, Zambezi, M, Manhique, al, et. Effects of a Short Message Service (SMS) Intervention on Reduction of HIV Risk Behaviours and Improving HIV Testing Rates Among Populations located near Roadside Wellness Clinics: A Cluster Randomised Controlled Trial in South Africa, Zimbabwe and Mozambique. AIDS & Behavior; 2019.

9. J, Gold, K, Aitken,C, G, Dixon,H, S, Lim,M, M, Gouillou, T, Spelman, al, et. A randomised controlled trial using mobile advertising to promote safer sex and sun safety to young people. Health Education Research; 2011.

10. Sandra, Delamere, S, Dooley, L, Harrington, A, King, F, Mulcahy. P92 - Safer sex text messages: Evaluating a health education intervention in an adolescent population. Sexually Transmitted Infections; 2006.

11. M, Mugo,P, W, Wahome,E, N, Gichuru,E, M, Mwashigadi,G, N, Thiong'o,A, A, Prins,H, al, et. Effect of Text Message, Phone Call, and In-Person Appointment Reminders on Uptake of Repeat HIV Testing among Outpatients Screened for Acute HIV Infection in Kenya: A Randomized Controlled Trial. PLoS ONE [Electronic Resource]; 2016.

12. G, Downing,S, C, Cashman, H, McNamee, D, Penney, B, Russell,D, E, Hellard,M. Increasing chlamydia test of re-infection rates using SMS reminders and incentives. Sexually Transmitted Infections; 2013.

13. R, Parkes-Ratanshi, J, Mbazira,Kimeze, E, Nakku-Joloba, M, Hamill,M, M, Namawejje, A, Kiragga, al, et. Low male partner attendance after syphilis screening in pregnant women leads to worse birth outcomes: the Syphilis Treatment of Partners (STOP) randomised control trial. Sex Health; 2020.

Comparison 1.2 – SMS intervention vs. SOC control containing active SMS component

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	SMS intervention	standard of care with SMS component	Relative (95% CI)	Absolute (95% CI)		
STI/HIV testing among sexually active participants (at < 12 months)												
2 [1,2]	randomised trials	not serious [a]	not serious	not serious	serious [b]	none	56/1498 (3.7%)	53/1458 (3.6%)	**OR 1.00** (0.68 to 1.47)	**0 fewer per 1,000** (from 11 fewer to 16 more)	⨁⨁⨁◯ MODERATE	IMPORTANT

CI: Confidence interval; **OR:** Odds ratio

Explanations

a. Risk of bias considered low for all domains in both studies, apart from unclear risk of bias relating to objective outcome assessment

b. Low number of events and relatively wide confidence interval.

References of included trials

1. A, Kelvin,E, G, George, E, Mwai, S, Kinyanjui, L, Romo,M, O, Odhiambo,J, al, et. A Randomized Controlled Trial to Increase HIV Testing Demand Among Female Sex Workers in Kenya Through Announcing the Availability of HIV Self-testing Via Text Message. AIDS & Behavior; 2019.

2. A, Kelvin,E, G, George, S, Kinyanjui, E, Mwai, L, Romo,M, F, Oruko, al, et. Announcing the availability of oral HIV self-test kits via text message to increase HIV testing among hard-to-reach truckers in Kenya: a randomized controlled trial. BMC Public Health; 2019.

Comparison 1.3 – SMS intervention blended with face-to-face vs inactive control

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	SMS intervention blended with in-person contact	inactive control	Relative (95% CI)	Absolute (95% CI)		
STI/HIV diagnosis (objectively confirmed, at <12 months)												
1 [1]	randomised trials	serious [a]	not serious [b]	not serious	very serious [c]	none	6/135 (4.4%)	13/125 (10.4%)	**OR 0.40** (0.15 to 1.09)	**60 fewer per 1,000** (from 87 fewer to 8 more)	⊕◯◯◯ VERY LOW	CRITICAL
Condom use (at < 12 months)												
2 [1,2]	randomised trials	serious [d]	not serious	not serious	serious [e]	none	185	175	-	SMD **0.25 higher** (0.02 higher to 0.48 higher)	⊕⊕◯◯ LOW	IMPORTANT
Compliance - took treatment for curable STI												
1 [1]	randomised trials	serious [f]	not serious [b]	not serious	serious [g]	none	52/137 (38.0%)	60/123 (48.8%)	**OR 0.64** (0.39 to 1.05)	**109 fewer per 1,000** (from 217 fewer to 12 more)	⊕⊕◯◯ LOW	IMPORTANT
Compliance -abstinence during treatment of curable STI												
1 [1]	randomised trials	serious [f]	not serious [b]	not serious	serious [g]	none	107/137 (78.1%)	102/123 (82.9%)	**OR 0.73** (0.39 to 1.37)	**49 fewer per 1,000** (from 175 fewer to 40 more)	⊕⊕◯◯ LOW	IMPORTANT

Partner notification

1 [1]	randomised trials	serious [f]	not serious [b]	not serious	serious [h]	none	124/137 (90.5%)	113/123 (91.9%)	**OR 0.84** (0.36 to 2.00)	**14 fewer per 1,000** (from 116 fewer to 39 more)	⊕⊕◯◯ LOW	IMPORTANT

CI: Confidence interval; **OR:** Odds ratio; **SMD:** Standardised mean difference, SMD values can be interpreted as small (.20), moderate (0.50), or large (0.8), (Cohen 2013) or as showing an important difference (0.50), (Ryan, Synnot et al. 2016).

Explanations

a. Some concern due to risk of performance bias and unclear other bias (baseline imbalance in Chlamydia prevalence and use of blocked randomization in only partly blinded trial.)

b. single study

c. Very low number of events and wide confidence interval that includes appreciable benefit

d. Some concern due to lack of blinding, and in one study unclear allocation concealment and unclear reporting and other bias

e. Relatively low number of events

f. Some concern due to risk of performance bias and unclear risk of detection bias

g. Low number of events and wide confidence interval that includes appreciable harm

h. Low number of events and wide confidence interval that includes appreciable benefit and harm

References of included trials

1. M, Trent, J, Perin, A, Gaydos,C, J, Anders, E, Chung,S, L, Tabacco,Saeed, al, et. Efficacy of a Technology-Enhanced Community Health Nursing Intervention vs Standard of Care for Female Adolescents and Young Adults with Pelvic Inflammatory Disease: A Randomized Clinical Trial. JAMA Network Open; 2019.

2. J, Mimiaga,M, B, Thomas, K, Biello, E, Johnson,B, S, Swaminathan, P, Navakodi, al, et. A Pilot Randomized Controlled Trial of an Integrated In-person and Mobile Phone Delivered Counseling and Text Messaging Intervention to Reduce HIV Transmission Risk among Male Sex Workers in Chennai, India. AIDS & Behavior; 2017.

Comparison 2 – Facebook intervention vs inactive control

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Facebook intervention	inactive control	Relative (95% CI)	Absolute (95% CI)		
STI/HIV test kit request (objective, at < 12 months												
1 [1]	randomised trials	serious [a]	not serious [b]	serious [c]	very serious [d]	none	One cluster RCT with analysis that (quote - personal correspondence with author) "used a contrast on cluster means, which indirectly takes the intracluster correlation into account." - Results (quote - p.322): "More intervention participants requested an HIV testing kit than control participants (25 of 57 [44%] vs. 11 of 55 [20%]; mean difference, 24 percentage points [95% CI, 8 to 41 percentage points]). For comparison purposes, a separate analysis using mixed-effects logistic regression gave consistent results."				⊕◯◯◯ VERY LOW	IMPORTANT

CI: Confidence interval; **MD:** Mean difference

Explanations

a. Some concern due to unclear risk of bias in all domains, apart from random sequence generation and incomplete outcome data domains

b. single study

c. Having requested HIV testing kit does not necessarily mean that HIV testing has been performed; we assume that participants had Facebook installed on their phones so that this qualifies as an mHealth intervention with 'push' component

d. Very small number of events and wide confidence interval; single study with insufficient power - quote: "Sample size was originally set assuming 7 clusters per condition. [...] Fiscal constraints required us to scale back the number of clusters to 2"

References of included trials

1. D, Young,S, G, Cumberland,W, J, Lee,S, D, Jaganath, G, Szekeres, T, Coates. Social networking technologies as an emerging tool for HIV prevention: a cluster randomized trial. Annals of Internal Medicine; 2013.

Comparison 3 – Smartphone App intervention vs inactive control

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Smart phone app	inactive control	Relative (95% CI)	Absolute (95% CI)		
STI/HIV diagnosis (self-reported)												
1 [1]	randomised trials	serious [a]	not serious [b]	not serious	serious [c]	none	69/214 (32.2%)	69/219 (31.5%)	**OR 1.03** (0.69 to 1.55)	**6 more per 1,000** (from 74 fewer to 101 more)	⊕⊕◯◯ LOW	CRITICAL
Condom use during receptive sexual intercourse (at < 12 months)												
2 [1,2]	randomised trials	serious [d]	not serious	not serious	serious [e]	none	41/237 (17.3%)	50/248 (20.2%)	**OR 0.85** (0.53 to 1.37)	**25 fewer per 1,000** (from 84 fewer to 55 more)	⊕⊕◯◯ LOW	IMPORTANT
Condom use during insertive sexual intercourse (at < 12 months)												
1 [2]	randomised trials	serious [f]	not serious [b]	not serious	very serious [g]	none	14/29 (48.3%)	15/31 (48.4%)	**OR 1.00** (0.36 to 2.74)	**0 fewer per 1,000** (from 232 fewer to 236 more)	⊕◯◯◯ VERY LOW	IMPORTANT
STI/HIV testing, self-reported (at <12 months)												
3 [1,2,3]	randomised trials	serious [h]	serious [i]	not serious	not serious	none	1483	1488	**RR 1.27** (1.05 to 1.52)	[insufficient data to generate absolute estimate]	⊕⊕◯◯ LOW	IMPORTANT

STI/HIV testing, self-reported (at <12 months) - Subgroup analysis: MSM, LMIC subgroup

2 [2,3]	randomised trials	serious [h]	not serious	not serious	not serious	none	1269	1269	**RR 1.40** (1.22 to 1.60)	[insufficient data to generate absolute estimate]	⊕⊕⊕◯ MODERATE	IMPORTANT

STI/HIV testing, self-reported (at <12 months) - Subgroup analysis: General population, HIC subgroup

1 [1]	randomised trials	serious [a]	not serious [b]	not serious	serious [j]	none	180/214 (84.1%)	168/219 (76.7%)	**RR 1.1** (1.0 to 1.2)	**77 more per 1,000** (from 0 fewer to 153 more)	⊕⊕◯◯ LOW	IMPORTANT

RR_objective STI/HIV testing_Zhu_photo of HIV self-test (at < 12 months)

1 [2]	randomised trials	serious [k]	not serious [b]	not serious	serious [l]	none	41/50 (82.0%)	9/50 (18.0%)	**RR 4.56** (2.49 to 8.35)	**641 more per 1,000** (from 268 more to 1,000 more)	⊕⊕◯◯ LOW	IMPORTANT

CI: Confidence interval; **HIC**: High-income countries; **LMIC**: Low- and middle-income countries; **MSM**: Men having sex with men; **OR:** Odds ratio; **RR:** Risk ratio

Explanations

a. Some concern due to high risk of performance bias, and unclear risk of detection and attrition bias

b. single study

c. Low number of events and wide confidence interval that includes appreciable benefit and harm

d. Some concern due to high risk of performance bias, and unclear risk of selection, detection and reporting bias in one study and unclear risk of detection and attrition bias in the other study

e. Low number of events and wide confidence interval that includes appreciable harm

f. Some concern due to high risk of performance bias, and unclear risk of selection, detection and reporting bias.

g. Very low number of events and wide confidence interval that includes appreciable benefit and harm

h. Some concern due to high risk of performance bias and unclear risk of selection, detection, and attrition bias in some studies, and unclear reporting bias in one study.

i. I2=76% may represent substantial statistical heterogeneity - to be explored via pre-specified subgroup analyses

j. Low number of events and confidence interval only just reaches null effect

k. Some concern due to high risk of performance bias and unclear risk of selection and reporting bias

l. Very low number of events and wide confidence interval

References of included trials

1. M, Nielsen,A, A, De,Costa, K, Gemzell-Danielsson, G, Marrone, J, Boman, M, Salazar, al, et. The MOSEXY trial: Mobile phone intervention for sexual health in youth - A pragmatic randomised controlled trial to evaluate the effect of a smartphone application on sexual health in youth in Stockholm, Sweden. Sexually Transmitted Infections.; 2019.

2. X, Zhu, W, Zhang, D, Operario, Y, Zhao, A, Shi, Z, Zhang, al, et. Effects of a Mobile Health Intervention to Promote HIV Self-testing with MSM in China: A Randomized Controlled Trial. AIDS & Behavior; 2019.

3. W, Tang, C, Wei, B, Cao, D, Wu, T, Li,K, H, Lu, al, et. Crowdsourcing to expand HIV testing among men who have sex with men in China: A closed cohort stepped wedge cluster randomized controlled trial. PLoS Medicine / Public Library of Science; 2018.

Other references

Cohen, J. (2013). Statistical Power Analysis for the Behavioural Sciences. Abingdon (UK), Routledge.
Ryan, R., A. Synnot and S. Hill (2016). Describing results, Cochrance Consumers and Communiations Group. **Version 2.0**.

Note: GRADE evidence profiles generating in GRADEpro|GDT: GRADEpro Guideline Development Tool [Software]. McMaster University, 2020 (developed by Evidence Prime, Inc.). Available from gradepro.org.

To achieve transparency and implicity, the GRADE system classifies the certainty of evidence in one of four grades:

Grade	**Definition**
High	Further research is very unlikely to change our confidence in the estimate of effect.
Moderate	Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low	Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low	Any estimate of effect is very uncertain.