

Pediatric weight management through mHealth compared to face-to-face care: cost analysis of a randomized control trial

AUTHOR(S)

Louise Tully, Jan Sorensen, Grace O'Malley

CITATION

Tully, Louise; Sorensen, Jan; O'Malley, Grace (2022): Pediatric weight management through mHealth compared to face-to-face care: cost analysis of a randomized control trial. Royal College of Surgeons in Ireland. Journal contribution. <https://hdl.handle.net/10779/rcsi.17882261.v2>

HANDLE

[10779/rcsi.17882261.v2](https://hdl.handle.net/10779/rcsi.17882261.v2)

LICENCE

CC BY 4.0

This work is made available under the above open licence by RCSI and has been printed from <https://repository.rcsi.com>. For more information please contact repository@rcsi.com

URL

https://repository.rcsi.com/articles/journal_contribution/Pediatric_weight_management_through_mHealth_compared_to_face-to-face_care_cost_analysis_of_a_randomized_control_trial/17882261/2

Supplementary material: unit costs and sources

Summary of costs

Component	Unit	Cost	Source
Usual care			
Direct administrative time (book appointment, send invite, phone parent, print handouts, patient check in) – 20 minutes	Pro rata total staff hourly rate per patient	€32.30	Micro-costing exercises with + Health Service Executive (HSE) 2013 salary scales + Health Information and Quality Authority (HIQA) guidance for calculating staff time (19-21)
Keyworker patient assessment and planning pre appointment (clinical coordinator) – 15 minutes		€37.59	
One-to-one session consultation with health and social care practitioner (HSCP) – 45 minutes		€115.95	
Group session (with three HCPs) – 90 minutes		€46.38	
Equipment (laptop and projector)	Equipment cost per child	€66.60	Estimated cost of €500 per item
mHealth			
HSCP time (monitoring, troubleshooting, checking in, for all children in mHealth arm) – 12 hours per week / 15 minutes per child, over 46 weeks	Pro rata total hourly senior physiotherapist rate per patient	€556.01	Micro-costing exercises + HSE 2013 salary + HIQA guidance for calculating staff time (19-21)
Software development and associated costs (videography, iconography, website and app domain name and hosting, device firmware updates)	Per participant in mHealth arm	€198.60	Trial expense receipts (converted from USD to Euro using retrospective exchange rate where applicable)
Smartphones*	Per device	€162.50	Trial expense receipts
Data packages*	Per participant	€33.90	
Software maintenance		€34.76	Estimated at 15-20% total development costs (https://www.fiercewireless.com/developer/maintaining-app-critical-to-its-overall-success)
Cloud data storage		€49.09	Estimated and converted from USD to Euro (https://buildfire.com/hidden-app-development-costs/)
Final measurement appointment (administrator and physiotherapist time)	Pro rata total staff hourly rate per patient	€10.74	Micro-costing exercises + HSE 2013 salary + HIQA guidance for calculating staff time (19-21)

*Research cost not included in cost comparison

Detailed breakdown of unit costs and sources

Table S1: Staff hourly rate based on HSE 2013 salary scales and calculated according to local Regulatory Impact

Salaries	A (mid-point of pay range)	B (direct salary cost - A + PRSI)	C (B + 4% [imputed pension costs])	D (C + 25% [overheads])	E - Annual working hours calculation ([249-annual leave entitlement] x 6.95)	Hourly rate (annual cost of grade ÷ annual leave calculation)
Senior physiotherapist	€ 59,208.00 (top of scale)	€ 65,750.48	€68,380.50	€ 85,475.63	1543	€ 55.40
Clerical officer (administrator - grade 4)	€ 34,522.50	€ 38,337.24	€39,870.73	€ 49,838.41	1543	€ 32.30
Clerical officer (clinical coordinator grade 7)	€ 53,545.00	€ 59,461.72	€61,840.19	€ 77,300.24	1543	€ 50.10
Senior Dietitian/Physiotherapist	€ 54,578.00	€ 60,608.87	€63,033.22	€ 78,791.53	1529	€ 51.53

Analysis guidelines*

*https://govacc.per.gov.ie/wp-content/uploads/Revised_RIA_Guidelines_June_2009.pdf

Table S2: Calculations of costs per participant for usual care (1:1 arm) based on micro-costing activities

Activity breakdown	Unit	Staff member	Hourly rate/ unit cost	Costs	Notes
One to one booster session, in-person	Time (mins) / equipment	-	-	Per child, per visit	Where range of minutes provided, mid-point used
Book appointment on system and send invite	8 mins	Administrator (grade 4 clerical officer)	€32.30	€4.31	
Phone parents for confirmation (week + day before)	8 mins	Administrator	€32.30	€4.31	
Prepare handouts	2-4 mins	Administrator	€32.30	€1.62	
Pre appointment keyworker planning per patient	15 mins	Clinical coordinator (grade 7 clerical officer)	€50.10	€12.53	
HSCP consultation	45 mins	Physio/ dietitian	€51.53	€38.65	

Total per appointment	-	-	-	€61.94	
Total cost for maintenance phase of treatment (completer)	-	-	-	€185.82	x3 booster sessions
Total cost for partial completion: dropped out before phase two	13 mins + 30 mins	Administrator + senior physio	€32.30 €55.40	€34.70	Invite/booking preparation admin + 30 minutes follow up and processing for dropout
Total cost for partial completion: did not attend after session one of three	13 mins + 15 mins + 30 mins	Administrator + clinical coordinator + senior physio	€32.30 €50.10 €55.40	€109.16	One booster session @ €61.94 + invitation preparation admin + pre-session keyworker planning + 30 minutes follow up and processing for dropout
Total cost for partial completion: dropped out after session one of three	30 mins	Senior physio	€55.40	€89.64	One booster session @ €61.94 + 30 minutes follow up and processing for dropout
Total cost for partial completion: did not attend after session two of three	13 mins + 15 mins + 30 mins	Administrator + clinical coordinator + senior physio	€32.30 €50.10 €55.40	€171.10	Two booster sessions @ €61.94 + invitation preparation admin + pre-session keyworker planning + 30 minutes follow up and processing for dropout
Total cost for partial completion: dropped out after session two of three	30 mins	Senior physio	€55.40	€151.68	Two booster sessions @ €61.94 + 30 minutes follow up and processing for dropout

Table S3: Calculations of costs per participant for usual care (group arm) based on micro-costing activities

Activity breakdown	Unit	Staff member	Hourly rate/ unit cost	Costs	Notes
<i>Group booster session, in-person</i>	<i>Time (mins) / equipment</i>	-	-	<i>Per child, per visit</i>	<i>Where range of minutes provided, mid-point used</i>
Laptop	1	-	-	€33.30	Estimated cost of €500
Projector	1	-	-	€33.30	Estimated cost of €500
Booking group appts	15 mins	Administrator	€32.30	€8.08	
Book room	10-30 mins	Administrator	€32.30	€10.77	
Send invites	60 mins	Administrator	€32.30	€32.30	
Phone parents for confirmation (week + day before)	120 mins	Administrator	€32.30	€64.60	
Prepare handouts	30-60 mins	Administrator	€32.30	€24.23	

Pregroup keyworker planning	225 mins (15 mins per patient)	Clinical coordinator (grade 7 clerical officer)	€50.10	€187.88	
Group booster session with three HSCPs	90 mins	Physio/ dietitian	€51.53	€231.90	
Total per appointment				€41.76	
Total for maintenance phase of treatment (completer)				€125.27	
Total cost for maintenance phase (partial completer)	30 mins	Senior physio	€55.40	€152.97	Full cost incurred as place in group is lost + 30 minutes follow up and processing for dropout

Table S4: Calculations of costs per participant in mHealth arm based on micro-costing activities

Activity breakdown	Unit	Staff member	Hourly rate/ unit cost	Costs	Notes
mHealth				Per child	Where range provided, mid-point used
HSCP time monitoring (checking in, troubleshooting, providing feedback to) app users	Hours (12 per week over 46 weeks)	Senior physio	€30,580.80	€556.01	
Software development + related costs	Sum total converted / participants	External contractors	€10,923.00	€198.60	Divided between n=55 participants randomised to mHealth
Final measurement appointment	Staff time	Administrator, physio	Admin €32.30, Physio €51.53	€10.74	Admin check in 2-6 mins, physio measures 10 mins
Software maintenance	15-20% total development costs		€1,911.53	€34.76	Source: https://www.fiercewireless.com/developer/maintaining-app-critical-to-its-overall-success Divided between n=55 participants randomised to mHealth
Data storage	Annual cost estimate		\$3600 pa total	€49.09	Source: https://buildfire.com/hidden-app-development-costs/ Converted using midpoint of other conversion rates (0.75) Conversion rate used: https://www.poundsterlinglive.com/best-exchange-

					rates/best-us-dollar-to-euro-history-2013
Total cost per user for maintenance phase (completer)				€849.20	
Total cost for partial completion: dropped out before phase two	Software development, maintenance and storage per child Processing dropout	Estimated costs calculated (above) Senior physio 30 mins	€282.45 €55.40 per hour	€310.15	All app development and maintenance costs (excluding weekly staff check-in and monitoring costs) + 30 minutes follow up and processing for dropout
Total cost for partial completion (dropout around 33% through maintenance phase):	Software development, maintenance and storage per child 15 mins per week monitoring + processing dropout	Estimated costs calculated (above) Senior physio	€282.45 €55.40 per hour	€495.30	All app development and maintenance costs + weekly staff check-in and monitoring costs (x 0.33 = €185.15) + 30 minutes follow up and processing for dropout
Total cost for partial completion (dropout around 67% through maintenance phase):	Software development, maintenance and storage per child 15 mins per week monitoring + processing dropout	Estimated costs calculated (above) Senior physio	€282.45 €55.40 per hour	€680.45	All app development and maintenance costs + weekly staff check-in and monitoring costs (x 0.66 = €370.31) + 30 minutes follow up and processing for dropout