

FINANCING PREVENTIVE WARM-UPS IN YOUTH FOOTBALL

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ABSTRACT

To examine the financial responsibilities of youth football clubs delivering neuromuscular warm-ups, with emphasis on coach time, equipment, and payment timing. In this study two youth football economic evaluations provided the financial comparisons. Injury-prevention trials, implementation studies, and economic guidance were assessed for programme content, cost coverage, statistical uncertainty, and organisational relevance. The Canadian evaluation included 744 players and estimated 1.27 fewer injuries per 1,000 player-hours (95% confidence interval 0.33–2.20). Its intervention-minus-control cost difference was CAD–689 per 1,000 player-hours (95% confidence interval –1,741 to 234). The Swiss evaluation included 1,002 players and estimated CHF240.66 lower costs per 1,000 football-hours (95% confidence interval 74.32–406.89), including CHF4.02 intervention expenditure per player-season. The Canadian programme required home balance boards and coach instruction; the Swiss programme required manuals and instruction courses. These expenditures precede potential treatment-cost reductions and may fall on different organisations. Neither evaluation tested a club financing contract. A club budget must identify the selected programme, additional cash expenditure, unpaid coach hours, and the dates on which payments fall due. Federation training, advance grants, reimbursement, and health-payer contributions distribute those obligations differently. Their effects on programme delivery, participation, and injuries require direct evaluation.

Keywords: youth football; neuromuscular warm-up; sport finance; coach labour; budget impact; injury prevention.

INTRODUCTION

A youth football club must allocate coach instruction, exercise supervision, and equipment expenditure before a preventive warm-up can operate throughout a season. Coaches also need time to learn exercise progressions and correct movement execution. These delivery requirements connect kinesiology with sports management: an effective exercise prescription must be supported by sufficient staff time and an approved operating budget. Across youth sports, a meta-analysis of neuromuscular training trials estimated a lower extremity injury incidence rate ratio of 0.64 (95% confidence interval [CI] 0.49–0.84) (Emery et al., 2015).

The Canadian youth football and Swiss children's football economic evaluations compared preventive exercise with usual warm-up practice (Marshall et al., 2016; Rössler et al., 2019). Both estimated lower injury-related expenditure after including intervention costs. Their financial accounts combine resources used by healthcare providers, families, and programme organisers. A club paying for instruction receives a cash benefit only through an actual reduction in its own expenditure or a payment from another organisation. The distinction determines whether a clinically beneficial programme is affordable to the organisation delivering it. Budget impact analysis addresses expenditure for a specified decision maker and period (Sullivan et al., 2014).

Reviews by Michaels-Igbokwe and colleagues, Grygorowicz and colleagues, and Lutter and colleagues examine injury-prevention economics across youth recreation, soccer, and sport, respectively (Michaels-Igbokwe et al., 2019; Grygorowicz et al., 2021; Lutter et al., 2022). Implementation costing also distinguishes expenditure borne by individual stakeholders

from total resource use (Eisman et al., 2021). For youth football, the purchasing decision concerns a particular programme, coach instruction, recurring delivery time, and access to funds before the season begins. Nonprofit sport organisations face separate financial, staffing, and infrastructure constraints (Wicker and Breuer, 2013); practical instruction and accessible exercise materials affect delivery in youth team sport (Lutz et al., 2024).

This review examines who pays for preventive warm-ups when the club supplies coaching resources and healthcare providers or families bear treatment expenditure. It assesses the two youth football economic accounts, identifies which delivery costs belong in a club budget, and specifies payment terms for instruction and recurring delivery. Adult football and other sports contribute comparisons of analysis and implementation support; financial estimates for youth football remain confined to the two directly relevant evaluations.

INJURY REDUCTION AND PROGRAMME EXPENDITURE

PROGRAMME CONTENT AND INJURY ENDPOINTS

The multinational 11+ Kids trial found an overall injury hazard ratio of 0.52 (95% CI 0.32–0.86) in children's football (Rössler et al., 2018). In Swedish adolescent female football, a different programme produced a rate ratio of 0.36 for anterior cruciate ligament injury (95% CI 0.15–0.85) (Waldén et al., 2012). A Nigerian trial involving 20 male youth teams and 414 players aged 14–19 years found an overall injury risk ratio of 0.59 (95% CI 0.40–0.86) with FIFA 11+ (Owoeye et al., 2014). These are distinct populations, interventions, and injury endpoints; they cannot be used interchangeably as a single saving per player.

A purchase specification must identify the eligible age group, exercises, progression, weekly delivery frequency, and coach instruction. The three trial estimates concern different injury endpoints and exercise prescriptions. The Nigerian trial establishes an injury-prevention effect in male youth football; it contains no Nigerian club-cost or treatment-saving estimate. Applying a financial estimate elsewhere therefore requires local treatment tariffs, healthcare access, and household expenditure.

CANADIAN AND SWISS FINANCIAL COMPARISONS

The Canadian evaluation included 380 intervention players and 364 controls. During 24,051 and 23,597 player-hours, respectively, the groups experienced 50 and 79 injuries; corresponding rates were 2.08 and 3.35 per 1,000 player-hours (Marshall et al., 2016). The Swiss evaluation included 614 intervention players and 388 controls, with 42 and 57 injuries during 43,777 and 32,596 football-hours (Rössler et al., 2019). Exposure differences make raw injury counts unsuitable for estimating a common effect across the two studies. Table 1 presents each economic comparison with its own observation period and cost coverage.

TABLE 1. COST ASCERTAINMENT, STATISTICAL ANALYSIS, AND LIMITS OF THE FOUR PRINCIPAL COMPARISONS.

Evidence	Features supporting interpretation	Limits relevant to management
Canadian economic evaluation (Marshall et al., 2016)	Cluster trial; Poisson injury analysis and 10,000 bootstrap replicates for cost uncertainty, with adjustment for team clustering, age, and previous injury.	Cost CI crosses zero. Healthcare-use details were missing for 13 of 129 injuries and imputed by injury type with physician checks. Tape, medication, first aid, heat, ice, and productivity losses were excluded. No club receipts or wages were measured.
Swiss economic evaluation (Rössler et al., 2019)	Prospective surveillance; parent follow-up; exposure-adjusted comparisons; mixed-effects injury analysis and bootstrap cost intervals.	Coach entry initiates injury follow-up; incomplete entry can miss cases. Parent productivity and sideline treatment are omitted. The cost analysis has less confounder control than the injury model. Transferability is limited by one health system and a short horizon.
Canadian delivery trial (Steffen et al., 2013)	Team allocation compares website instruction, workshop delivery, and workshop plus physiotherapist support; adherence has a defined session denominator.	Adjusted adherence differences were not statistically significant. Additional support costs were not compared economically. A secondary knowledge-and-beliefs analysis (McKay et al., 2014) is not another trial.
Swedish handball trial (Ageberg et al., 2025)	Active programme comparison in 18 clubs; use is presented with an odds ratio and CI.	Different sport and intervention package. Wide uncertainty does not establish equivalence; coach questionnaire responses do not independently verify exercise fidelity or cost-effectiveness.

Appraisal concerns the identified cost and delivery questions. The Canadian knowledge-and-beliefs analysis uses the delivery trial population. The handball comparison contributes implementation evidence only.

The Canadian cost interval crosses zero, permitting both lower and higher expenditure despite the negative point estimate. The Swiss cost interval lies below zero and includes intervention expenditure. Neither comparison measures money received by a club or assigns clubs to alternative payment arrangements. The Swiss economic sample is the national component of the multinational 11+ Kids trial.

An adult comparison reinforces the need to separate clinical and economic endpoints. Among 479 Dutch male amateur players, The11 reduced injury-related costs without a significant difference in overall injury incidence (Krist et al., 2013). Its inclusion of adult productivity losses limits application to children, while the cost result demonstrates the financial importance of injury severity. Swart and colleagues' decision analysis of athletes aged 14–22 years favoured universal neuromuscular training over screening followed by targeted training under its assumptions (Swart et al., 2014). The comparison selects between universal and targeted prevention under model assumptions; routine club expenditure and reimbursement were outside its decision question.

COACH INSTRUCTION AND ADHERENCE

In 31 Canadian female youth football teams followed for four months, completion of possible FIFA 11+ sessions was 73.5% with website instruction, 81.3% after a workshop, and 85.6% after a workshop with physiotherapist support. Adjusted differences were not statistically significant (Steffen et al., 2013). These percentages describe adherence; they do not establish that the most intensive package offers the best value. The analysis of coach and player knowledge and beliefs (McKay et al., 2014) uses the same trial population and does not add a separate funding comparison.

An active comparison in Swedish youth handball likewise cautions against equating added support with improved use. Programme use was 66% versus 58%, with an odds ratio of 1.33 (95% CI 0.42–4.24), and no demonstrated improvement in implementation outcomes (Ageberg et al., 2025). This wide interval permits materially different effects and cannot prove equivalence. It also cannot be transferred as a football estimate. Its relevance is methodological: purchasing more support requires comparison of its additional resources and outcomes against a realistic alternative.

CLUB EXPENDITURE AND PAYMENT RESPONSIBILITY

CASH PAYMENTS AND UNPAID COACH TIME

The accounting problem begins with the comparator. When a preventive programme replaces the usual warm-up within an unchanged session, charging its entire duration as additional paid labour overstates the incremental cash requirement. However, learning, planning, travel, correction, record keeping, and extra minutes may still displace other work. Paid expenditure, unpaid time, and displaced activity need separate records. The absence of a wage payment does not establish the absence of a staffing constraint.

For season s , the incremental cash requirement borne by the club can be written as

$$\Delta B_s = \Delta I_s + \Delta W_s + \Delta E_s + \Delta A_s - G_s - R_s - S_s, \quad (1)$$

where ΔI_s is additional instruction and travel expenditure, ΔW_s paid club-coaching labour, ΔE_s equipment and facility expenditure, and ΔA_s administration and verification expenditure relative to existing practice. G_s denotes programme-specific grants, R_s reimbursements, and S_s documented reductions in the club's own expenditure. Each transaction is assigned once. A course paid directly by a federation is excluded from club cash expenditure and is not also entered as a club grant. Equation 1 specifies the transactions in the club cash account. Avoided healthcare costs enter S_s only when the club actually bears and reduces that expenditure.

An equivalent record of additional unpaid hours can distinguish instruction, preparation, delivery, and verification. Those hours should not be added to the cash account unless a wage or reimbursement is paid. A broader economic evaluation may value them using a specified opportunity-cost method; if an hour is already included as paid labour, valuing it again as unpaid time would double count the same resource. What the hour displaces also matters: a longer practice may require additional facility time, whereas instruction within an existing session may redistribute coaching attention without changing the cash outlay.

Programme expenditure differs materially between the two evaluations. Marshall and colleagues costed a wobble board at CAD20 per player and a two-hour instruction session at CAD35 per hour for each team (Marshall et al., 2016). Rössler and colleagues allocated CHF267 to manuals and CHF2,200 to instruction courses, totalling CHF2,467 or CHF4.02 per intervention player-season (Rössler et al., 2019). The Swiss costing also considered potential coach opportunity costs for attendance. These amounts identify equipment and instruction requirements; they do not price a club's recurring supervision, replacement purchases, or administration. A club ledger must distinguish initial instruction from refresher courses, acquisition from replacement, and routine delivery from research data collection (Eisman et al., 2021).

PAYMENT DATES, ELIGIBLE COSTS, AND CONTINUITY

A payment agreement must identify whether the club needs preseason cash, coach instruction, or funding for recurring paid time. Table 2 distinguishes five contractual options by payer, due date, eligible expenditure, and continuation terms.

These options follow from the allocation of expenditure; the two youth economic evaluations did not compare their effects. A small qualitative study of youth sports safety education identified differing administrative and volunteer views across three Pennsylvania sites (Epertheiner, 2022); its findings support attention to local decision processes, not an estimate of how often a particular barrier occurs.

TABLE 2. PAYMENT TIMING AND COST RESPONSIBILITY FOR PREVENTIVE WARM-UPS.

Alternative	Payer and payment timing	Resources and verification	Selection and continuation criteria
Club funding	Club pays instructors and staff when costs arise; expenditure approved before the season.	Named course, paid hours, necessary materials, and proportionate delivery checks; invoices and time records.	Suitable when cash and staffing capacity exist. Continue only after reviewing reach, recurring costs, and delivery burden.
Central training	Federation purchases instruction before the season; clubs nominate coaches.	Programme-specific practical training and materials; attendance plus a check of exercise demonstration.	Suitable when instruction is the shared constraint. Provide access for late appointments and coach turnover; training attendance alone is insufficient.
Advance grant	Federation, public agency, or charitable payer transfers agreed funds before eligible costs fall due.	Explicit eligible items, payment ceiling, accountable recipient, and end-of-season reconciliation.	Suitable when upfront cash prevents uptake. Review use of funds and delivery; unspent money follows agreed return or carry-forward terms.
Reimbursement	External payer settles eligible invoices after expenditure or at staged intervals.	Approved training, materials, or paid delivery; receipts and agreed evidence of implementation.	Suitable only when the club can bridge payment delays. Compare administrative cost and exclusion of clubs with low liquidity.
Health-payer contribution	Insurer or healthcare purchaser supports defined delivery under a prospective agreement.	Verified instruction and delivery, separate injury surveillance, and a stated data-access agreement.	Plausible when the payer bears treatment costs. Renewal depends on agreed evidence and affordability, not an assumed reduction in premiums or guaranteed annual savings.

The payment date determines which organisation supplies working capital. An end-of-season reimbursement can lower a club's net annual cost while leaving its preseason cash shortage unresolved. Central instruction can reduce an immediate training requirement while leaving recurring preparation and documentation unpaid. A course subsidy covers instruction expenditure; recurring preparation and documentation require a separate allocation of coach time. Agreements also need to state who pays for coach replacement and refresher training; a one-off attendance record does not establish continuing capacity.

Family benefits and charges require their own assessment. Fewer appointments can reduce travel, care, and time away from work, but these consequences depend on treatment arrangements and household circumstances. A participation surcharge creates an immediate household payment even if a favourable population-average economic estimate exists. In the absence of willingness-to-pay or affordability data, it cannot be justified by assigning the study's average saving to each family.

Payment for verified instruction and delivery can be separated from injury surveillance. Linking remuneration to low injury counts could encourage incomplete injury recording; this incentive has not been tested in the reviewed comparisons. Independently collected injury records and payment based on specified delivery activities allow the two functions to be assessed separately. The agreement must also allocate the staff time required for verification.

EVALUATION OF A FINANCING ARRANGEMENT

PAYMENT ALLOCATION AND CLUB-LEVEL COMPARISON

A comparison of funded and unfunded clubs does not automatically identify the effect of payment. If funding also supplies practical instruction, supervision, equipment, and reminders, the intervention is a support package. Its effect is the joint consequence of those components. To examine payment alone, both groups need the same access to the

programme and instruction, with the financing rule as the assigned difference. To assess a package, its components and expenditures should be stated explicitly, without attributing the entire effect to reimbursement.

Randomisation at club level is preferable when coaches or resources are shared across teams and team allocation would allow contamination. Allocation should account for club size and existing staffing arrangements, with outcomes analysed at the appropriate cluster level. Usual practice, external training, payer contributions, and coach movement between clubs need documentation. Intention-to-treat analysis estimates the effect of offering the assigned arrangement; a comparison based only on clubs that complied can be distorted by pre-existing organisational capacity. Such allocation would test a financing arrangement directly; the available economic trials tested exercise programmes.

The EPIC football protocol uses a type 3 hybrid implementation-effectiveness design, placing implementation outcomes alongside clinical outcomes (Lindblom et al., 2025). Its primary emphasis on implementation distinguishes programme delivery from clinical effectiveness. The protocol contains no outcome estimate for either implementation support or payment.

MEASURE IMPLEMENTATION, INJURY, AND EXPENDITURE SEPARATELY

The primary implementation outcome can be the proportion of eligible team sessions in which the specified programme was delivered, with exercise completeness and progression checked separately. Reach should use the eligible population as its denominator, including players who seldom attend. Coach logs can provide frequency, but a sample of direct observation is needed to assess whether a recorded session contained the prescribed exercises. Questionnaire-based intention to continue is not the same as observed maintenance.

Injury surveillance needs a prospectively fixed case definition, medically attended and time-loss categories, training and match exposure, severity, and follow-up after the season (Bahr et al., 2020). Access to care must be recorded because a medically attended outcome reflects both injury occurrence and treatment-seeking. Assessors collecting clinical and resource-use information should be independent of payment verification where practicable. Missing injury, session, and cost records must be tabulated by allocation group, with the method of handling missing observations stated explicitly.

Financial outcomes should include gross programme spending, net club cash requirement, timing of payments, unpaid coach hours, and the cost of administration. Cost per registered player and cost per player reached require separate, explicitly stated denominators. Health-payer expenditure and household costs remain separate outcomes; transfers between accounts are not additional societal resource use. Startup and recurring costs should also be separated, so a first-season purchase does not become an assumed annual expense.

Cost uncertainty needs to account for clustering and skewness, including the possibility that a small number of severe injuries dominate annual expenditure. A club with no injuries in one season has not thereby demonstrated programme effectiveness, and a club with one expensive injury has not disproved it. Prospective sample-size work must be tied to the selected primary outcome and intracluster correlation; no numerical sample-size recommendation is possible without those inputs. Clinical effects may require more clubs or longer follow-up than an implementation endpoint. Renewing a contract on the basis of delivery evidence is a management decision, not proof of avoided injuries.

DISCUSSION

The Canadian and Swiss comparisons show why treatment-cost reduction and club affordability require separate assessment. The Canadian programme purchased home balance boards and team instruction; 11+ Kids purchased manuals and instruction courses. Each evaluation included programme expenditure in its cost comparison, yet neither traced grant receipts, recurring coach wages, or reimbursements within a club ledger. A negative injury-cost difference therefore provides an economic reason to support prevention without establishing the cash available to the delivering club.

Coach employment determines how the same instruction requirement enters an operating budget. A paid coach may require wages for course attendance and preparation; a volunteer coach contributes time that may restrict availability even when the cash payment is zero. Federation payment of a course fee leaves travel and attendance time to be allocated. Similarly, a health-payer contribution transfers financial responsibility between organisations without creating an additional reduction in total resource use. The managerial decision concerns both the amount due and the organisation able to provide it when needed.

The Canadian delivery trial also separates adherence from the purchase of support. Website instruction, a workshop, and a workshop with physiotherapist support yielded different completion percentages, but adjusted differences were statistically inconclusive and support costs were not compared economically. More intensive supervision consequently cannot be selected on the percentages alone. An agreement should specify practical instruction, exercise observation, and record keeping, then assess their expenditure alongside programme use and injury outcomes.

Interpretation is limited by purposive English-language retrieval, variable access to full text, and appraisal without an independent second reviewer. The two economic comparisons concern specific exercise programmes, health systems, and observation periods. The Canadian valuation statements differ between the methods and cost-table headings; the numerical amounts are retained without a currency-year adjustment. Neither comparison establishes current local prices, and household productivity, recurring coach labour, and administrative expenditure are incompletely represented. Adult football, the young-athlete decision analysis, and handball contribute comparison of methods or delivery rather than additional youth football financial observations. The EPIC protocol supplies a trial design without outcome data.

Direct evaluation of payment requires club transactions, dated transfers, and coach-time records collected alongside session delivery and injury surveillance. The two economic studies contain no contract comparison from which to select a superior payer or payment schedule. Advance grants may resolve a preseason cash shortage, while reimbursement requires the club to bridge the delay. Central instruction addresses training access but leaves recurring workload to be assigned. These distinct obligations must be measured before a payment arrangement can be credited with changes in programme use or injuries.

CONCLUSION

Preventive warm-up funding in youth football requires an exercise specification and a dated allocation of instruction, equipment, coaching, and administration expenditure. The Canadian and Swiss evaluations support prevention within their respective cost accounts, with greater uncertainty around the Canadian cost difference. They do not establish funds received by clubs or a preferred financing contract. Club budgeting must therefore record additional cash payments and unpaid coach hours separately, identify the treatment-cost beneficiary, and secure funds before eligible expenditure falls due. Comparative club-level evaluation is needed to determine how payment terms affect delivery, access, and injury outcomes.

DECLARATIONS

AUTHOR CONTRIBUTIONS

All authors contributed equally and all authors read and approved the final version of this manuscript.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest related to this study.

DATA AVAILABILITY

The data supporting the findings of this study are included within the manuscript.

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