

Health Care Provider Performance Review

Identifying strategies to improve health worker performance, increase utilization of health services, & reduce mortality in LMIC



Summary by Guilhem Labadie
with guidance from Alex Rowe

HCPPR: A brief overview (1)

- **HCPPR** is a **systematic review** of the **effectiveness of strategies to improve health care provider (HCP) performance in low- and middle-income countries (LMICs)**
- **Investigators**
 - Alexander K. Rowe (Centers for Disease Control and Prevention)
 - Samantha Y. Rowe (Centers for Disease Control and Prevention)
 - David Peters (Johns Hopkins University)
 - John Chalker (Management Sciences for Health)
 - Kathleen A. Holloway (World Health Organization)
 - Dennis Ross-Degnan (Harvard Medical School)
- HCPPR includes **any quantitative study** of the **effectiveness of any strategy to improve HCP performance in LMICs, in any language, published or not**

HCPPR: A brief overview (2)

HCPs broadly defined as **public or private-sector health workers** in hospitals, clinics, & communities; lay health workers; pharmacists; and shop keepers who sell medicines

Eligible study designs include:

- **pre- vs. post-intervention studies with a comparison group** (with or without randomization)
- **post-intervention only studies with randomized controls**
- **interrupted time series (ITS)**

Includes **499 studies from 1960s to 2006** (for published studies) and **2008** (for unpublished studies). HCPPR is **being updated** to include studies **up to early 2016**.

Main results: no age limit / not child specific

Results for children (restricted to children less than 5 years): calculated for this summary, indicative (less thorough analysis, less studies, less comparisons) by Guilhem Labadie under the supervision of Alex K. Rowe

Methods: outcomes and effect sizes

- **Analysis** restricted to **comparisons of a strategy vs. “no new strategy”** control group (i.e., no head-to-head comparisons of 2 active strategies)
- Effect size in terms of an **absolute percentage-point (%-point) change**
- **Positive values** mean **improvement**
- For **% or dichotomous outcomes**:
 - Effect size = $(FU - BL)_{\text{intervention}} - (FU - BL)_{\text{controls}}$
- For **continuous outcomes**:
 - Effect size = $[(FU - BL)/BL]_{\text{intervention}} - [(FU - BL)/BL]_{\text{controls}}$
- For **studies with >1 primary outcome**, the **median effect size for all primary outcomes** was used to represent study (median = middle value)

Methods: literature search

15 electronic databases (e.g., CINAHL, EPOC specialized register, MEDLINE), which was **completed in 2006** (update currently underway **up to early 2016**)

Document inventories of 30 organizations involved with HCP performance for unpublished studies, which was **completed in 2008**

Hand search of bibliographies from **510 previous reviews** and other articles

Studies used **wide variety of outcomes**; for more of an “apples–apples” comparison, data were divided into **24 subgroups**, based on:

- **Outcome category** (6 general categories),
- **Outcome scale** (dichotomous/% vs. continuous),
- **HCP type** (health facility (HF) HCPs vs. CHW-only studies)

Only comparison of results **within subgroups**, which is like **24 parallel systematic reviews**

Methods: defining strategies

A **unique strategy** was defined as any **unique combination** of the following **10 component categories** (except patient and community support only).
Each of these **10 component categories** lists different **strategy components**:

- | | |
|--|---|
| 1. Patient and community support
(e.g., community education) | 6. Supervision
(e.g., improved routine supervision, or audit & feedback) |
| 2. Strengthening infrastructure
(e.g., provide medicines) | 7. Other management techniques (not group problem solving & supervision)
(e.g., HCP self-assessment, change a process of care) |
| 3. Financing and incentives
(e.g., change user fees) | 8. High-intensity training (duration >5 days + at least 1 interactive educational method) |
| 4. Regulation and governance
(e.g., accreditation scheme) | 9. Low-intensity training (duration ≤5 days or no interactive educational method) |
| 5. Group problem solving
(e.g., continuous quality improvement) | 10. Printed or electronic info or job aid for HCPs that is not part of another component |

The above component categories can be used alone (e.g., training only) **or in combination** (e.g., training + supervision).

Generalizability / external validity

Pragmatic decision for this summary

(the HCPPR Team is planning to use the GRADE approach)

	Effect size ≥15 %-points	≥3 studies	Low / Moderate risk of bias studies (LMROB)
“relatively strong recommendation”	YES	YES	≥3 studies with LMROB
“weak recommendation”	YES	YES	1 or 2 studies with LMROB
“good in similar settings?” if specific setting “promising but understudied” if ≠ settings	YES	No	1 or 2 study with LMROB
“very weak evidence”	YES	No	None

Jumping to “main” recommendations of unique strategies for:



No age limit:
all studies

**ALL
AGES**



Child specific:
0-5 years



**CHILD
SPECIFIC**

IMPROVING PROCESSES OF CARE

Improving processes of care for HF-based HWs

ALL AGES

“Supervision + high-intensity training”

“Complex strategy”:

Patient/com support + strengthen infrastructure + reg/gov + other manage tech + supervision + low-intensity train

Training on multiple topics

Training on simple topics

Supervision

“relatively strong recommendation”

“weak recommendation”

Duration of at least **6 days**

1-2 days

Feedback to HCPs explicitly included

LRS > MRS?

MRS

Additional days
potentially better
Potentially all
“on-site” better
Potentially all
“on-site” better

LRS = low resource setting MRS = moderate resource setting



“Good in similar settings?” / “Promising but understudied”

ALL AGES



Strategies with effect size >30%-points tested in only 1 study with robust design:

Effect size (%-points)

Other management techniques (structured prescribing form) + poster for HCPs + high-intensity training

Correct prescriptions for antibiotics in an inpatient department of one private, non-profit hospital in Colombia with baseline performance: ~40%

57

Other management techniques + group problem solving + supervision + high-intensity training

36

Strengthen infrastructure + high-intensity training

35

Patient/community support + strengthen infrastructure + other management technique + supervision + low-intensity training

32

Strengthen infrastructure + other management technique + supervision + high-intensity training

32

Patient/community support + financing/incentives + strengthen infrastructure + regulation/governance + high-intensity training

30

Improving processes of care for HF-based HWs



Strategy (number of comparisons, number of low / moderate comparisons)	Effect Size (% point)	
Group Problem Solving + Training Low Int (2,0)	79.125	"very weak evidence"
Financing/incentives + Supervision + Training High Int (1,0)	42	"very weak evidence"
Strengthen infrastructure + Other management techniques + Supervision + Training High Int (1,1)	A 42	"Promising but understudied"
Patient/community support + Regulation/governance + Training Low Int (1,0)	39.05	"very weak evidence"
Strengthen infrastructure + Training High Int (1,1)	A 38.4	"Promising but understudied"
Other management techniques + Supervision + Training Low Int (1,1)	33.3	"Promising but understudied"
Group Problem Solving (4,2)	30.85	"weak recommendation"
Other management techniques + Training Low Int (1,0)	30.6	"very weak evidence"
Other management techniques + HCP_Info (1,1)	29.5	"Promising but understudied"
Patient/community support + Strengthen infrastructure + Financing/incentives + regulation/governance + Training High Int (1,1)	A 25.55	"Promising but understudied"
Patient/community support + Training Low Int (4,1)	19.1	"weak recommendation"
Regulation/governance + Other management techniques + Supervision + Training Low Int (1,1)	18	"Promising but understudied"

A Unique strategies with same recommendation as all ages analysis

Improving processes of care for CHWs

- 7 studies with **high or very high risk of bias**
- For **training only** (low- or high-intensity, N = 3 studies), median effect size = **11 %-pts**
- For “**patient/community support + training**”, median effect size = **37 %-pts BUT just 2 studies**



Strategy (**number of comparisons**, **number of low / moderate comparisons**)

Patient/community support + training (low intensity) (**2,0**)

Patient/community support + training (low intensity) (**1,0**)

Effect Size
(% point)

37
(all ages)

56.2
(children)

“very weak evidence”

ALL
AGES

CHILDREN

LOWERING MORTALITY

Lowering mortality in HF-based HWs settings

Training HCPs + community support
+ other management techniques

ALL
AGES



“very weak evidence”

Strategy (number of comparisons, number of low / moderate comparisons)

Effect Size
(% point)

Group Problem Solving + Training Low Int (2,0)

130.8

Strengthen infrastructure + Other management techniques +
Supervision + Training High Int (1,0)

77.8

Patient/community support + Other management techniques +
HCP_Info (1,0)

50.5

Patient/community support + Training High Int (1,0)

30.85

Patient/community support + Strengthen infrastructure +
Financing/incentives + Group Problem Solving + Supervision +
Training Low Int (1,0)

30.5



“very weak evidence”

CHEID

Lowering mortality in CHWs settings

ALL AGES



Community support + incentives + governance
+ other management techniques + group problem solving
+ supervision + training

Community support + infrastructure + incentives + governance
+ supervision + training

Infrastructure (e.g., providing medicines) + supervision + training

“Promising but understudied”

CHW ID

Effect Size (number of comparisons, number of low / moderate comparisons)

Effect Size
(% point)

Patient/community support + Strengthen infrastructure + Training Low Int (1,0)

93.9

“very weak evidence”

Patient/community support + Financing/incentives + Regulation/governance +
Other management techniques + Group Problem Solving + Supervision +
Training High Int (2,2)

86.7

“Promising but
understudied”

Patient/community support + Strengthen infrastructure + Financing/incentives
+ Supervision + Training High Int (2,0)

20.305

“very weak evidence”

Patient/community support + Strengthen infrastructure + Supervision +
Training Low Int (1,1)

19.05

“Promising but
understudied”

Strengthen infrastructure + Supervision + Training Low Int (2,0)

17.35

“very weak evidence”

Strengthen infrastructure + Financing/incentives + Supervision + Training High
Int (1,0)

15.025

“very weak evidence”



INCREASING UTILIZATION

Increasing utilization in HF-based HWs settings (continuous outcomes)

Strategy (number of comparisons, number of low / moderate comparisons)	Effect Size (% point)
Financial incentives for HCPs or health facilities (alone or in combination with other strategy components) (10, 1)	67 (2, 119)
Insurance (4, 0)	16 (-44, 47)
Reduce or remove user fees only (5, 2)	15 (-12, 42)
Introduce or increase user fees only (6, 2)	-53 (-82, -17)



ALL AGES

“weak recommendation”

Strategy (number of comparisons, number of low / moderate comparisons)	Effect Size (% point)
Patient/community support + Regulation/governance + Training Low Int (1,0)	38.3
Financing/incentives (1,0)	24.8
Patient/community support + Strengthen infrastructure + Financing/incentives + Other management techniques + Supervision + Training Low Int (1,1)	21.4
Strengthen infrastructure + Financing/incentives + Supervision (1,0)	15.15



“Promising but understudied”

“very weak evidence”

“Promising but understudied”

“very weak evidence”

CHIEF

Increasing utilization in HF-based HWs settings (% outcomes)

Strategy (number of comparisons, number of low / moderate comparisons)	Effect Size (% point)
Patient/community support + Strengthen infrastructure + Financing/incentives + Other management techniques + Training Low Int (1,0)	38.15
Patient/community support + Financing/incentives + Supervision (1,0)	18.6



“very weak evidence”

Increasing utilization in CHWs settings (% outcomes)

Strategy (number of comparisons, number of low / moderate comparisons)	Effect Size (% point)
Patient/community support + Strengthen infrastructure + Other management techniques + Supervision + Training High Int (1,0)	23.1



“Promising but understudied”

CHANGING NON CARE SEEKING BEHAVIORS

In HF-based HWs settings (% outcomes)

Strategy (number of comparisons, number of low / moderate comparisons)	Effect Size (% point)
Group problem solving + Training Low Int (2,0)	89.15
Patient/community support + Supervision + Training Low Int (1,0)	30.8
Training Low Int (1,0)	25.1
Patient/community support + Regulation/governance + Training Low Int (1,0)	18.3



“very weak evidence”

In CHWs settings (% outcomes)

Strategy (number of comparisons, number of low / moderate comparisons)	Effect Size (% point)
Patient/community support + Financing/incentives + Other management techniques + Supervision + Training High Int (1,1)	64
Patient/community support + Supervision + Training High Int (3,2)	38.25
Patient/community support + Financing/incentives + Regulation/governance + Other management techniques + Group problem solving (2,2)	26.775
Patient/community support + Training Low Int (2,0)	16.725



“Promising but understudied”

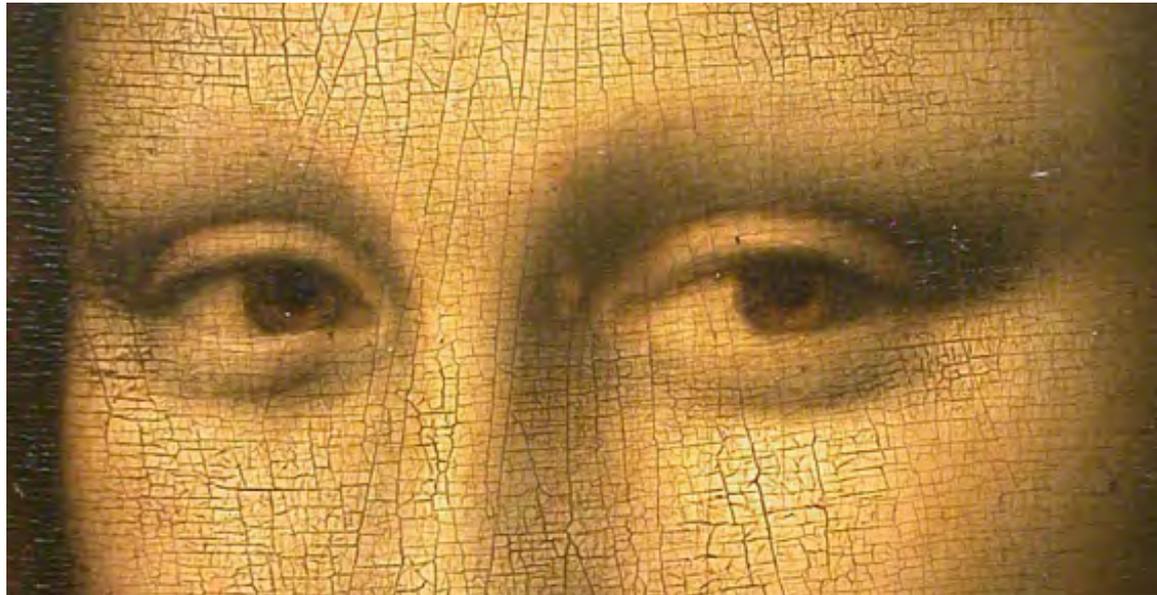
“weak recommendation”

“Promising but understudied”

“very weak evidence”

CHIEF
 EDITOR

More detail on results



Literature search

	Studies included (children)	Unique strategies (children)
Total (>105,000 citations screened, 824 reports included in review)	499	161
Strategy effectiveness health facility based*	145 (38)	55 (25)
Strategy effectiveness Lay or CHWs*	7 (3)	6 (2)
Analysis on factors associated with effectiveness of training*	99	-
Analysis on factors associated with effectiveness of supervision*	27	-
Impact of strategies on mortality total**	35	29
Impact of strategies on mortality health facility based**	25 (16)	24 (18)
Impact of strategies on mortality CHW**	10 (9)	8 (7)
Impact on the utilization HF based**	55 (4)	42 (4)
Impact on the utilization HF based (% outcomes)	(8)	(11)
Impact on the utilization CHWs (% outcomes)	(9)	(8)
Impact on non-care seeking behaviour (% outcomes) HF	(14)	(12)
Impact on non-care seeking behaviour (% outcomes) CHW	(12)	(10)

*results only for studies with at least one **Process Outcome** expressed as a **Percentage**: “POPs”

** results only for studies with continuous outcomes

- **Total:** 79 countries, 52% from LIC. **Mortality analysis:** 19 countries, 77% from LIC.
- **Risk of bias for all studies** (based on guidance from the **Cochrane EPOC Group**): 14% low, 21% moderate, 31% high, 35% very high
- Number & % of **high-quality studies** (low/moderate risk of bias) **increased over time**
- **Most strategies tested by only 1 or 2 studies each (generalizability uncertain)**

Strategy effectiveness for HF-based HCPs :

Focus on results of strategies with at least 3 studies each

Strategy (no. of comparisons / no. with low or mod risk of bias)

ALL AGES



No. of comparisons with a low or moderate risk of bias

Total no. of comparisons that evaluated the strategy

Printed or electronic information or job aids for HCPs only (6/4) -3

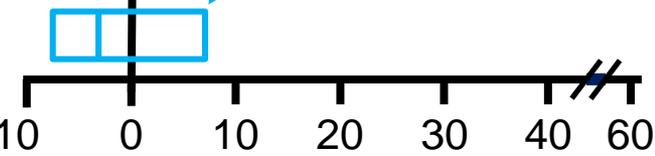
Effect size (%-points)

Median

Median effect size

Median & IQR

Interquartile range (middle 50% of studies)



Broadened definition (BD): if effectiveness decreased after broadening the strategy definition to include similar studies from other contexts, then bias would be a concern and the lower, more conservative “broadened” estimate of strategy effectiveness would be used.

Strategy (no. of comparisons / no. with low or mod risk of bias)

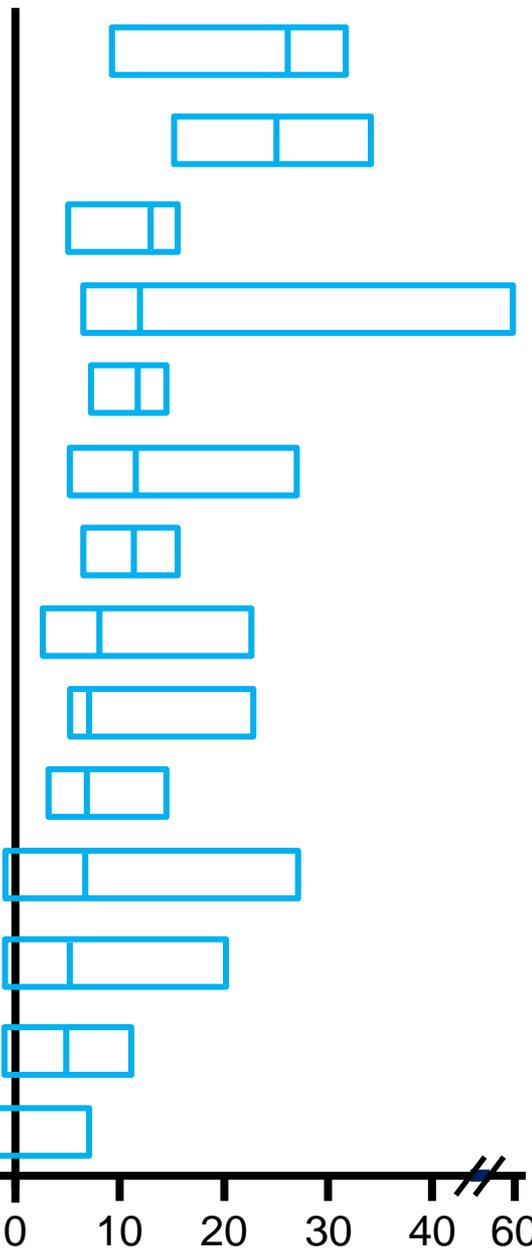


Median

Median & IQR

- Supervision + high-intensity training (17/8; BD)
- Patient/com support + strengthen infrastructure + reg/gov + other manage tech + supervision + low-intensity train (4/1; BD)
- Patient/community support + low-intensity training (6/3)
- Group problem solving + low-intensity training (6/1; BD)
- High-intensity training only (10/4)
- Supervision + low-intensity training (29/12; BD)
- Patient/community support + other manage techniques (3/2)
- Low-intensity training only (39/16)
- Group problem solving only (14/5; BD)
- Supervision only (12/6)
- Patient/community support + supervis + low-intensity train (5/2)
- Regulation/governance + other management techniques + supervision + low-intensity training (3/2)
- Supervision + printed or electr info or job aids for HCPs (3/2)
- Printed or electronic information or job aids for HCPs only (6/4)

26
25
13
12
12
11
11
8
7
7
7
5
5
-3



BD = Broadened definition

Effect size (%-points)

-10 0 10 20 30 40 60

Low- vs. moderate-resource setting (selected results)

Note: All results based on 3 or more studies unless otherwise specified

**ALL
AGES**



Strategy

Low
resource

Moderate
resource

Comment

Supervision + high-intensity training (> 5 day with interactive method)

28

17

Effective in both, but seems more effective in low-resource settings

Patient/community support + low-intensity training

13

24

Effective in both, but seems more effective in moderate-resource settings

“Complex” strategy (patient/com support, infra, training, etc.)

10
(N = 1 study)

30

Under-studied in low-resource settings, but effects seem greater in moderate-resource settings

Factors associated with greater effectiveness of training and supervision for HF-based HWs

- **Studies with strategies that included training or supervision (analyzed separately)**



- **Unweighted mixed linear regression model: predicted effect sizes of training or supervision adjusted for other strategy components, baseline, public setting, and on-site training**

- **ONLY FOR MULTIPLE HEALTH TOPICS effectiveness increases by 2-3 % points per added day for training**
- **Training all on-site** (i.e., the place where the health worker typically works) had an average effectiveness level that was **8.2 %-points greater** than training that **completely or partially off-site** ($p = 0.0061$).
- **Supervision that included explicit feedback** to health workers had an average effectiveness level that was **10.8 %-points greater** than supervision without feedback ($p = 0.0038$)



ALL AGES

Impact of strategies on mortality

HF-based HCPs

Effect sizes tended to be higher for strategies that included:
training HCPs

+ **community support** (e.g., community education)

+ **other management techniques** (e.g., establish referral chain)

3 studies with low or moderate risk of bias which all tested a unique strategy including these 3 component categories

CHWs

Strategy tested by only **1 or 2 low or moderate risk of bias studies**

Effect size

Community support + incentives + governance

+ other management techniques + group problem solving

+ supervision + training

91

%-points

Community support + infrastructure + incentives + governance

+ supervision + training

82

%-points

Infrastructure (e.g., providing medicines) + supervision + training

19

%-points

Incentives = CHW salaries; governance: Community oversight of CHWs

Pragmatic recommendations

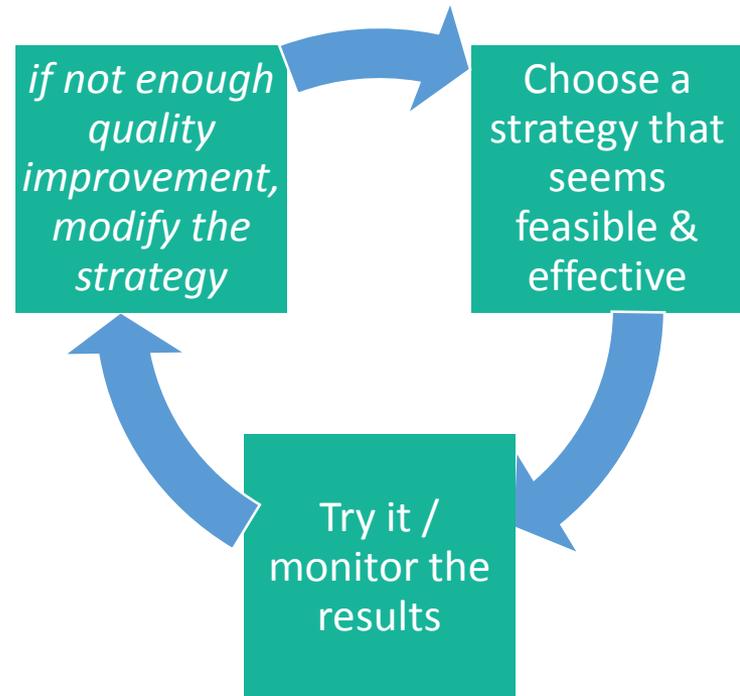
No strategy with effect size > **40** % point AND “**relatively strong recommendation**”

Wide variation of effect sizes among the studies for most strategies: **difficulty in predicting how effective a strategy will be in a particular setting.**

Pragmatic recommendations:

Monitor / evaluate any strategy

Consider quality improvement as a step-wise, incremental process



Thoughts on children analysis

Some strategies are “promising but understudied” for both “all ages” AND “children”: these strategies could be targeted first for implementation and further studying together with the “weak recommendation” strategies.

Is it useful to analyse separately children from all ages outcomes? There is a limited number of studies. Very few strategies with ≥ 3 comparisons already.

With the **update** there may be **more studies / comparisons** which could help to find out the **best strategies for children specific outcomes**.

It could be also then interesting to differentiate strategies which target more care givers (breast feeding / health literacy / care seeking) which are **adults** and may be compared with the “all ages” analysis, from strategies targeting directly the child (performance for measuring stunting, respiratory frequency, drug administration or dosage) which may need more specific strategies.

Thank you!



Precision on summary effect size for ITS study

Segmented linear regression modeling was performed to estimate a summary effect size that **incorporated both the level and trend effects**.

The **summary effect size** was the **outcome level at the mid-point of the follow-up period as predicted by the regression model minus a predicted counterfactual value that equaled the outcome level based on the pre-intervention trend extended to the mid-point of the follow-up period**. This summary effect size was used because it **allowed the results of ITS studies to be combined with those of non-ITS studies**.