Contents lists available at ScienceDirect

Public Health

journal homepage: www.elsevier.com/locate/puhe

Review Article

# Evidence-based public health leadership development: A systematic review and urgent call to include psychological theory

Fiona Day [a,*], Vicky Snape [b], Dhanya Gardner [c], Cecilia Vinchenzo [d], M.N. Dalili [e], S.G. Baird [f], Kalu Udu [g], Jim McManus [h]

[a] Fiona Day Consulting, England, United Kingdom
[b] Blackpool Council, United Kingdom
[c] South West Public Health Training Programme, England, United Kingdom
[d] Mersey and West Lancashire Teaching Hospitals NHS Trust, United Kingdom
[e] Mersey and West Lancashire Teaching Hospitals NHS Trust, United Kingdom
[f] Wirral Council, England, United Kingdom
[g] NHS NW Training Programme, England, United Kingdom
[h] NHS Wales, Wales, United Kingdom

ARTICLE INFO

*Keywords:*
Public health
Leadership
Psychology

ABSTRACT

*Objectives:* Public health leadership is key to addressing complex healthcare and societal challenges. There is a lack of consensus regarding the optimal structure, content, methods, timings and evaluations of leadership development in this vital aspect of public health practice. Our aim was to systematically review and synthesise the current empirical evidence on the effectiveness of public health leadership development interventions, including the use of psychological theory.
*Study design:* This study employed a systematic review design.
*Methods:* This review was developed and is reported following PRISMA guidelines.
*Results:* After de-duplication and abstract screening, the search identified 20 papers for full data extraction. Studies were published between 2007 and 2025, conducted across a range of geographic settings. Sample sizes ranged from 7 participants to more than 1500 in large national organisation settings. Four broad categories of leadership development intervention types were identified and synthesised into three sub-groups: individual-, organisational- and system-level findings, including population health outcomes. Only three studies referenced the use of psychological theory to underpin their interventions.
*Conclusions:* Effective public health leadership development appears to be less about isolated interventions and more about ecosystems that combine training, coaching and team practices with supportive organisational cultures and structures, underpinned by improving equity and digital accessibility. We are concerned about the disparate and underdeveloped state of the evidence, and the paucity of application of psychological theory: Coaching Psychology, the science of workplacea performance and wellbeing, is likely to be well placed to provide this. Public health is underpinned by a rigorous commitment to evidence-based practice: we believe that it is urgently time to apply the same rigour to the practice of developing public health leadership in order to address the complex health and geo-political challenges we face.

## 1. Introduction

Public health leadership is key to addressing complex challenges,[1,2] and the discipline is facing significant geo-political threats. The methods used to develop leadership capacity are often 'haphazard' and rarely based on theory,[3,4] both generally and in healthcare. A recent systematic umbrella review in healthcare settings found that experiential based approaches, coaching and mentoring were the most effective methods.[4] The review suggested substantial consistency in the main conclusions across different specialties, disciplines and settings, however specific

This article is part of a special issue entitled: Psychology & Public Health published in Public Health.

* Corresponding author. Fiona Day Consulting, 15 Hawthorn Road, Leeds, LS7 4PH, United Kingdom.
*E-mail address:* Fiona@fionadayconsulting.co.uk (F. Day).

https://doi.org/10.1016/j.puhe.2026.106178
Received 30 September 2025; Received in revised form 16 January 2026; Accepted 27 January 2026

public health inclusion and exclusion criteria were not applied, nor were any subgroup analyses conducted.

We believe that the findings from the umbrella review cannot be automatically assumed to apply to public health due to discipline-specific requirements, combining traditional management skills with transformational change leadership to collectively improve public health[5] and ensure successful knowledge translation.[6] Only one of the 86 reviews included was conducted in a public health context: Li et al.'s,[7] scoping review of pre-COVID emergency preparedness including first responders/emergency services but did not relate to public health leadership outwith the context of emergency response.

There have been efforts to actively shape the development of public health leaders for several decades, such as the United States 'Institute of Medicine' report on the future of public health (1988).[8] Various competency frameworks and curricula have been developed subsequently, often based on needs assessments.[2,9,10] However, public health leadership has recently been described as 'often lacking', with 'notable exceptions' during the COVID-19 Pandemic,[11] and a scoping review of pandemic leadership concluded *'it is necessary and more urgent than ever to continue and increase investment in the preparation of those in charge … the training of professionals and leaders is a paramount action'*.[2]

In 2024, The World Health Organisation (WHO) defined 'essential public health functions' of the public health workforce,[12] composed of 20 interrelated competencies, with additional behaviours required for public health leadership outlined in a competency framework. They noted that leadership is both important and possible at all levels of the workforce, and that "*Leadership can be learned, taught and evaluated.*".[13]

The competency approach has flourished since the 1970s, but while competency frameworks may seem to neatly operationalise leadership, they:[3,4,14,15] do not specifically predict future leader behaviours; are based on present rather than future requirements; do not take contexts into account; are often rigidly applied and confused with leadership itself; do not take the full, relational elements of leadership into account; and fail to reflect the findings that leaders can achieve the same results using entirely different approaches and also that leadership development also requires helpful organisational cultures and structures.

Leadership is a multi-faceted, contested concept with evolving definitions. Individual leadership development interventions are behavioural interventions, and the development and implementation of behaviour change technologies are recognised within both public health and behavioural science communities to be enhanced by applying theory.[16] Leadership development interventions, in common with many behavioural interventions, are not usually based on underlying theory: explicit references to theory are rare, as are the application or testing of theories of behaviour change.[3,16,17] The term 'theory' is variously described, with one definition expressed as: *"a systematic way of understanding events or situations. It is a set of concepts, definitions, and propositions that explain or predict these events or situations by illustrating the relationships between variables."*(18, p1). As leadership development behaviour change is underpinned by adult learning, skill acquisition, behaviour change, motivation, identity and self views,[3] the discipline of psychology is well placed to provide robust underlying theories to support leadership development.

Given that there is a lack of consensus regarding the optimal structure, content, methods, timings and evaluations of public health leadership development – as well as system-level requirements for leaders to be effective, we aimed to systematically synthesise the empirical evidence on the impact of public health leadership development interventions. As we believe that evidence-based public health leadership development should be underpinned by robust psychological theory for reasons outlined above we sought to address the following questions:

1. What is the type and volume of the published literature relating to leadership development interventions for the public health workforce?
2. What is the evidence of the effectiveness of leadership development for the public health workforce?
3. What is the evidence of psychological theory underpinning public health leadership development interventions?
4. What are the future priorities for practice and research into public health leadership development, including the role of psychological theory?

## 2. Methods

This review followed PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines for systematic reviews[19] and is reported in compliance with the PRISMA-SR reporting checklist.[20] Any deviations are documented. A protocol was published a priori.[21]

### 2.1. Data sources & search strategy

An independent librarian was commissioned to develop a comprehensive search strategy based on the protocol and research questions. Terms were selected based on previous systematic reviews in the medical leadership field and adapted to the public health domain. The databases searched included PubMed, Web of Science, EMBASE (Ovid), Cochrane Library, and MEDLINE, spanning Jan 1, 1993 to June 23, 2025 as we were unaware of any earlier relevant publications. Our full search process is provided in Supplementary Table 1.

### 2.2. Inclusion & Exclusion Criteria

Inclusion & Exclusion Criteria are in Supplementary Table 2.

Manuscripts not in English were excluded, as were commentaries, letters, editorials, pre-prints, conference abstracts and/or presentations. In order to be inclusive, we did not pre-define the concept of leadership and used studies' own self-reported definitions.

### 2.3. Study selection and screening

Deduplication of search results was carried out using Bond University's Systematic Review Accelerator Deduplicator[22] and 'Covidence Systematic Review Software',[23] as well as manually. Two authors independently screened titles and abstracts, with an initial 21 % jointly conducted by two authors to establish consistency. Two or more authors undertook full text reviews. Any disagreements were resolved through discussion between additional authors. Reasons for exclusion at the full-text stage are recorded in Fig. 1. We did not conduct any backward referencing or include any grey literature.

### 2.4. Data extraction

A standardised data extraction spreadsheet was created, the full list is provided in Supplementary Material 1. Two reviewers manually extracted data, with any disagreements resolved through discussion.

### 2.5. Assessment of use of psychological theory

Use of psychological theory in the Introduction or Methods Sections only was assessed with reference to a simplified version of Michie & Prestwich's theory coding scheme[16] and Michie's behaviour change taxonomy[24] (FD). Definitions of leadership in each study were extracted verbatim from the relevant study (FD).

### 2.6. Assessment of methodological quality and risk of bias

Due to time constraints, formal study quality assessments were not completed. Informal assessment of study quality was made by a single author and documented in the data extraction spreadsheet. Due to significant heterogeneity, lack of data and poor study quality, risk of bias

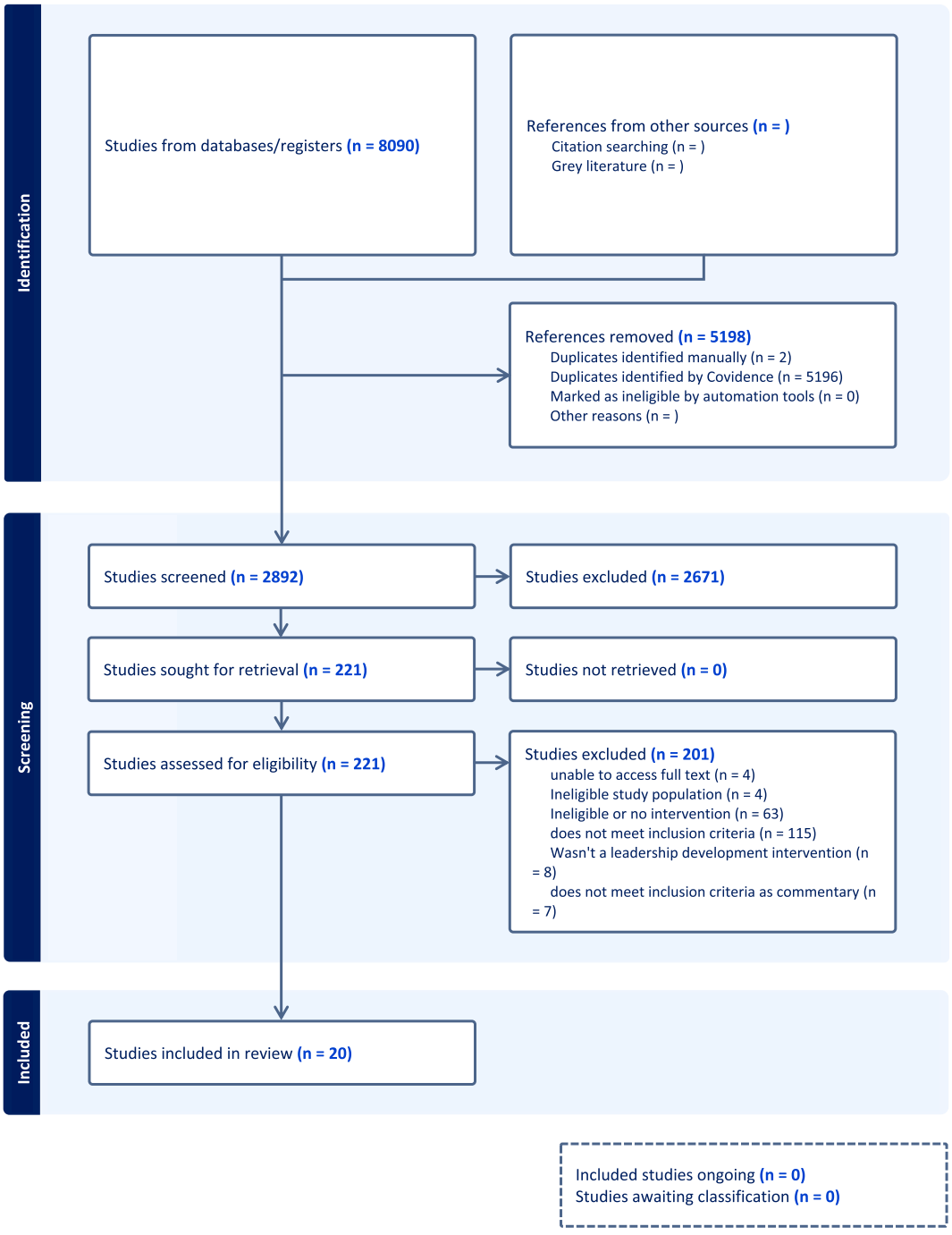


**Fig. 1.** Preferred reporting Items for systematic reviews & meta-analyses chart.

was not formally undertaken. Instead the Risk Of Bias In Non-randomized Studies – of Interventions, Version 2 (ROBINS-I V2) tool[25] was used by a single author to guide informal comments.

### 2.7. Data analysis and presentation

Qualitative and quantitative data were synthesised descriptively and thematically using textual narrative synthesis,[26] mapping the existing research and identifying knowledge gaps. The textual narrative approach uses commentary to report on study characteristics, context, methodological quality and findings, and the breadth, differences and similarities amongst included studies to draw conclusions - the synthesis. Initial textual narrative synthesis was undertaken by a single author with supplementary analysis conducted by co-authors.

## 3. Results

### 3.1. Search outcome

The search identified 8090 studies, of which 5189 were excluded due to duplication (Fig. 1). 2892 papers were reviewed by title and abstract. 20 papers were identified for full data extraction.

### 3.2. Study characteristics

Table 1summarises the main characteristics of the included studies,

**Table 1**
Summary of Included Studies (alphabetical order).

| Authors (Year) | Country | Aim/Objective | Methodology | Sample | Leadership intervention description | Leadership outcomes measured | Main Findings & Conclusions |
|---|---|---|---|---|---|---|---|
| **Amde, Sanders & Lehmann (2014)**[32] | South Africa, Mozambique, Rwanda, Ethiopia | Discuss achievements and challenges of building institutional and individual capacity to develop and deliver new forms of training for health workforce development | Mixed methods<br>Interviews and group discussions, review of publications and project documents<br>Thematic analysis | n = 18<br>Trainees enrolled in MPH and representatives of partner organisations | Joint Masters in Public Health (MPH) programme with a focus on health workforce development by four academic institutions from East and Southern Africa, combining distance and face-to-face learning | Leadership and organisational capacity development outcomes | • Graduates successfully applied learning in real-world contexts e.g. establishing a national Human Resources for Health unit in Ethiopia's Ministry of Health.<br>• Curriculum valued for its relevance, though students stressed tailoring it to local issues and involving district managers.<br>• Challenges included distance learning limitations and difficulties sustaining mentorship, even after introducing stipends, due to mentors' limited availability. |
| **Amde, Van Houweling & Van Herten (2019)**[33] | Mozambique, Rwanda, Ethiopia | Explore factors influencing contribution of training to organisational capacity development | Mixed methods<br>Purposive sampling case study, semi-structured interview<br>Thematic analysis | n = 18<br>13 male, 5 female MPH students affiliated with health ministries or public health training institutions | Blended public health Masters programme that sought to improve the capacity of personnel involved in teaching, management, or development of human resources for health | Leadership and organisational capacity development outcomes | • Training makes a 'latent' contribution to organisational capacity development, which is realised (or not) through multilevel, interacting contextual and relational factors.<br>• Graduates' ability, capacity and opportunity to apply newly developed skills and expertise varied, due in part to divergent individual and organisational goals and expectations<br>• Implementers need to focus more on the likely interaction and best possible alignments between training relevance, student selection for potential to contribute, recognition and career advancement potential. |
| **Amutah-Onukagha et al. (2023)**[38] | USA | Assess the impact of Minority Leadership Program (MLP) modules on MLP alumni | Mixed methods<br>Qualitative data analysis of MLP applicants, online survey, interviews<br>Thematic analysis | n = 90<br>Former cohort members of MLP by National Alliance of State and Territorial AIDS Directors (NASTAD) | Minority Leadership Program, designed to enhance leadership skills among ethnic minority public health professionals working in various levels of state or CDC–funded city health departments | Achievement of individual-level leadership experiences after completion of MLP | • Alumni had enhanced confidence and communication skills, better able to identify opportunities for professional development<br>• Benefitted from networking with people with similar experiences<br>• Challenges commonly faced after MLP completion: Lack of diversity within leadership and in the workplace and microaggressions |
| **Barbina et al. (2025)**[39] | Italy | Evaluate the impact of the European Public Health Leadership Course | Mixed methods<br>Pre- and post-training questionnaire, analysis of exam performance on the course | n = 39 | European Public Health Leadership Course - 3 week blended learning course grounded on Competency-Based Education (CBE) and Problem Based Learning (PBL) methodology, developed by the WHO and Italian National Institute of Health | Evaluation of learning on the course, course quality, course satisfaction and success on the course (passing score on final exam). Any development of participants leadership characteristics and training impact | • 38/39 participants passed all the summative tests. Formative tests showed an increase in knowledge.<br>• Participants indicated a high level of satisfaction with the training. |

(*continued on next page*)

**Table 1** (*continued*)

| Authors (Year) | Country | Aim/Objective | Methodology | Sample | Leadership intervention description | Leadership outcomes measured | Main Findings & Conclusions |
|---|---|---|---|---|---|---|---|
| **Belcher et al. (2019)**[40] | USA | Evaluate Ferguson Fellows' leadership qualities and the odds of submitting research for presentation at national scientific meetings following implementation of multimodal mentorship ($M^3$) | Qualitative<br>Self-evaluation survey at 4 weeks within programme and post-completion of fellowship | n = 54<br>Ferguson programme fellows/alumni | Ferguson Fellowship – 9-week research programme, designed to increase interest in public health research careers, comparing those who did and did not receive multimodal mentorship ($M^3$) | Self-assessed leadership quality development and research productivity post-fellowship | • Self-assessment of leadership qualities demonstrated that transformational leadership characteristics improved significantly in participants who received $M^3$.<br>• Little to no differences in transactional and laissez-faire leadership, regardless of $M^3$ participation.<br>• $M^3$ Fellows had almost 4 times higher odds of submitting research to scientific meetings compared to those who did not. |
| **Bhimani, Roitenberg & Suarly (2021)**[37] | Canada | Describe the benefits, lessons learned and next steps of 'Triple M', a coaching and mentorship programme for public health leadership development | Case study, descriptive practice report | n = 28<br>14 mentors, 14 mentees | 'Triple M' (Mobilizing Meaningful Mentorship), providing one-on-one mentorship and coaching, stretch assignments, and leadership seminars to build leadership in a public health unit | Descriptive outcomes for anticipated and actualized gains in individual and organisational level skills | • Additional time is needed to apply programme learnings during stretch assignments<br>• Adequate protected time is required to actively participate in the mentorship component<br>• Through role modelling and reflection, mentors are able to help mentees develop their own leadership capabilities. Provides an opportunity for mentors to make meaningful contributions to the professional development of mentees and apply and reinforce learnings on coaching and mentorship.<br>• Enables mentors to share knowledge and insights to facilitate growth in mentees' leadership development. |
| **Bigirinama et al. (2024)**[29] | Democratic Republic of Congo | Examines the impact of RIPSEC mentorship programme on Walungu Health Zone Management Team's leadership capacities and health outcomes performance in the Walungu 'Learning and Research Zone' | Mixed methods, case study<br>Retrospective quantitative trend analysis of key health indicators, in-depth interviews with Health Zone Management Team | n = 7<br>Walungu Health Zone management members who had served for at least two consecutive years overlapping with the RIPSEC programme period | RIPSEC mentoring programme for strengthening leadership and management capacity | Individual and organisation-level management and leadership outcomes, organisation-level health outcomes with specific links to leadership for each outcome provided by authors | • Use of curative health services slightly increased during programme, but rates remained below 50 %, and gains were not sustained post-programme<br>• Mentorship has positively impacted leadership and performance<br>• Comprehensive strategies beyond enhancing managerial leadership solely, are necessary. |
| **Black et al. (2022)**[31] | Switzerland | Descriptive evaluation of WHO Health Emergencies Programme innovative online leadership course | Descriptive case evaluation | n = not specified<br>44 programme participants in 2019, 215 in 2022 | 'Leadership in Emergencies training programme', a WHO Health Emergencies Programme 8-week leadership course including weekly themed online meetings, peer learning and support network | Individual and programme-level outcomes | • Cohorts are larger and can be run more frequently allowing a greater mix of experience and skills<br>• Online learning improves access<br>• Diversity of trainers, facilitators and participants has increased - participation has expanded to marginalised populations, representation of women in the |

(*continued on next page*)

**Table 1** (*continued*)

| Authors (Year) | Country | Aim/Objective | Methodology | Sample | Leadership intervention description | Leadership outcomes measured | Main Findings & Conclusions |
|---|---|---|---|---|---|---|---|
| | | | | | | | course has grown (31 % in 2019, 48 % in 2022).<br>• High level of engagement and trust between the organisers and learners helped the organisers better understand the learning needs of participants |
| **Blanchard & Carpenter (2012)**[41] | South Africa | Evaluation of a pilot action learning group programme with managers in a rural public health setting | Cross-sectional qualitative design<br>Focus group discussions<br>Thematic analysis | n = 17 | 11 month action learning group programme for leadership development conducted for public health sector managers in a rural health district in northern KwaZulu-Natal | Experience of the action learning programme and reflection on its value | • Action learning has the potential to serve as a learning and development opportunity for managers working in rural public health settings. |
| **Brandert et al. (2022)**[42] | USA | Evaluate lessons learned from participants at 3 regional public health leadership institutes (PHLI's) | Cross-sectional, mixed-methods evaluation of participants programme evaluation data | n = 78 | 3 PHLI's delivering 8-12 month-long varied leadership and management programmes including lectures, assignments, coaching, mentoring, problem-based learning, individual leadership plans, experiential learning, simulations, networking | Each of our 3 PHLI evaluation plans uses the Kirkpatrick Model. Self-reported leadership skills development, competency gains, behaviour changes, individual progression into leadership positions and impact on wider the local organisation and wider workforce | • Changes in individual skill, competency and behaviour change, individual career progression, "ripple effects" to others in the workforce and increased collaboration across sectors and/or geographic locations.<br>• Public health training centers are well suited to provide PHLI training.<br>• Long-term investments are needed: the need for leadership development for the current and future public health workforce is urgent. |
| **Bryant & Ward (2017)**[43] | Canada | Evaluation of Peel Public Health unit in Ontario, Canada organisation-wide strategic workforce development programme | Case report, qualitative description of outcome indicators | n = not specified<br>Organization of over 650 staff training cohorts | Theory and evidence-driven public health leadership and capacity development programme developed with core public health competencies in mind around workforce planning, human resource management and capacity development e.g. training, mentoring, OnCore public health skills course | Analytical and leadership capacity, satisfaction with orientation, culture change indicators | • Employees gain skill and knowledge, competencies are important inputs<br>• Effective human resource processes ensure appropriate job design, recruitment and orientation.<br>• Analysis of the workforce ensures a strong pool of potential leadership successors.<br>• Theory, research evidence, and data provide a robust foundation for workforce development.<br>• A comprehensive workforce development strategy enables the development of a skilled workforce capable of responding to population needs |
| **Carbone et al. (2025)**[34] | Kenya, Malawi, Nigeria, Peru, Rwanda, and Uganda | To evaluate the influence of the Leading and Managing for Results in Pandemics (LMRP) programme on applying leadership and management practices and on pandemic readiness | Mixed methods<br>Pre- and post-intervention surveys and assessments, semi-structured interviews | n = 430<br>53 teams who completed LMRP programme | LMRP programme – team-based, blended learning programme developed to strengthen the capacity of public health leaders responding to COVID-19 | Participants ability to face challenges related to COVID-19, how the programme contributed to participants ability to apply the eight leading and managing practices | • Improvements in leadership and management skills, pandemic readiness, and interpersonal skills<br>• Gained knowledge, skills, and tools, which they applied to perform more effectively as a team and to lead preparation for and |

(*continued on next page*)

**Table 1** (*continued*)

| Authors (Year) | Country | Aim/Objective | Methodology | Sample | Leadership intervention description | Leadership outcomes measured | Main Findings & Conclusions |
|---|---|---|---|---|---|---|---|
| | | | | | | | management of public health emergencies/disease outbreaks. |
| **Chène et al. (2025)**[30] | France | Evaluation of the 2nd WHO European Public Health Leadership Course | Mixed methods Qualitative programme descriptive evaluation, Likert-style survey, open-ended questionnaire | n = 53 | WHO European Public Health Leadership Course (2023 cohort) – hybrid online and in-person, problem-based learning, lectures, panel discussions, networking | Participant self-reported aspects of programme evaluation including experience, learning, quality and value/satisfaction | • 27/35 respondents were "very satisfied", 8/35 were "satisfied."<br>• 23 participants awarded the highest rating to programme content, 12 rated it 4 out of 5.<br>• Balance between lectures and interactive exercises and the hybrid structure received 4 or 5 from 34 participants.<br>• Recommendations: inclusion of more debate and media communication skills, negotiation, multiculturalism, climate change, and misinformation management. |
| **Cusack et al. (2018)**[27] | Canada | Evaluate use of participatory action research (PAR) to empower and develop public health nurses leadership and advocacy skills | Group interviews, semi-structured questionnaire, qualitative analysis meeting agendas/ summary documents, research reflective journal | n = 7<br>Public health nurses | Participatory action research initiative | Empowerment, confidence, collaborative leadership Research group process and outcome evaluation | • Bringing forward and validating nursing knowledge to develop a shared organisational vision<br>• Applying new evidence to the local context, challenged participants views, provided reassurance<br>• Increased personal value in the importance of their nursing knowledge and the role of nursing leadership<br>• Nursing leaders should strive to implement programmes and policies based on participatory approaches. |
| **Dean et al. (2014)**[28] | USA | Describe and evaluate the CDC's National Center for HIV/AIDS, Viral Hepatitis, Sexually Transmitted Disease (STD), and Tuberculosis (TB) Prevention (NCHHSTP) strategic, center-wide workforce development and leadership capacity building approach | Mixed methods Surveys, focus group interviews | n = 1586<br>NCHHSTP employees | 9 initiatives including coaching and leadership initiative, mentoring, writing workshop, onboarding, career development sessions | Participants programme and personal development outcomes, multi-year comparison of workforce development objectives (through survey results) | • 93 % agreed that existing leadership skills had been enhanced by attending the session.<br>• 97 % of Coaching and Leadership Initiative attendees indicated changes in the Leading Change competencies, 80 % indicated changes in the Leading People competencies. |
| **Dean et al. (2021)**[44] | USA | Examine whether a coaching intervention changes leadership behaviours amongst first- and second-level leaders in the federal public health agency NCHHSTP | Mixed methods 2 semi-structured interviews, participant survey | Survey: n = 103<br>Interview: n = 80 | Coaching and Leadership Initiative (CaLI) initiative, incorporates the US Office of Personnel Management (OPM) Leadership 360 assessment and 6 coaching sessions | Self-reported development across 28 leadership qualities | • All indicated that CaLI helped provide new perspectives, practices and approaches that led to better outcomes<br>• 71 participants completed phase 1 evaluation: 66 (93 %) made changes in developing others, 56 (79 %) completed conflict management and team building, and 16 (23 %) completed leveraging diversity.<br>• 46 participants completed both phase 1 & phase 2 interviews. Among those who made changes post-CaLI, 23/26 (88 %) sustained |

(*continued on next page*)

**Table 1** (*continued*)

| Authors (Year) | Country | Aim/Objective | Methodology | Sample | Leadership intervention description | Leadership outcomes measured | Main Findings & Conclusions |
|---|---|---|---|---|---|---|---|
| | | | | | | | those leadership changes in developing others, 21/27 (78 %) in team building, 24/34 (71 %) in conflict management, and 5/10 (50 %) in leveraging diversity. |
| **O'Connell, Stoneham & Saunders (2016)**[45] | Australia | Evaluate an online e-mentoring programme aimed at building public health advocacy skills among public health professionals | Qualitative<br>Open-ended semi-structured interviews | n = 18<br>8 mentors, 10 mentees | 12-month Public Health Advocacy Institute of Western Australia (PHAIWA) online e-mentoring and skill-based activities programme | Self-reported programme benefits and perceived contribution of programme components to overall advocacy outcomes | • Overall positive impact on participants advocacy knowledge and skills<br>• Mentees described increased confidence and experience in undertaking advocacy strategies, feeling more empowered to undertake actions like writing articles.<br>• Participants appreciated the flexible nature of the online format, especially those in more rural settings<br>• Negative aspects: mentees withdrawal from the programme due to time pressures, unclear expectations or competing commitments. |
| **Olson (2013)**[46] | USA | Evaluate factors that facilitate or impede participation and development of leadership practices in alumni of the Regional Institute for Health and Environmental Leadership (RIHEL | Mixed methods<br>Mailed alumni leadership development survey, open-ended survey, open-ended telephone interview<br>Grounded theory analysis | Surveys: n = 67<br>Interview: n = 20<br>Purposive sample of RIHEL alumni 1999–2002 | RIHEL programme - yearlong leadership development programme | Change in pre- and post-test Leadership Practices Inventory (LPI-Self) scores, self-reported leadership development outcomes | • Significant improvements across all 5 exemplary leadership practices: 80 % (n = 54) had at least 1 or more practices increase by the mean change score, 62 % (n = 44) at least 2 LPI practices increase by the mean, and nearly half (n = 31) showed at least 3 practices changing.<br>• Years of public health service negatively correlated with Total Change scores of LPI.<br>• Ongoing support was a key contributor to leadership growth.<br>• Suggest that comprehensive, sustained leadership training effectively fosters lasting improvements in public health leaders skills and capacity to lead. |
| **Orton et al. (2007)**[36] | USA | Evaluation of the Emerging Leaders in Public Health (ELPH) training programme and its ability to develop "civic entrepreneurs" who can improve the efficiency and the effectiveness of their organisations | Mixed methods<br>Surveys, interviews, financial revenue data analysis | n = 490<br>119 teams graduating over 3 years<br>Interview: n = 73 | ELPH initiative delivered by The Management Academy for Public Health. Includes multi-day residential leadership sessions, coaching, guided public health business plan development | Individual and organizational-level changes, financial evaluation of completed projects from public health teams having completed the coaching programme | • Strong engagement and completion: >850 public health managers enrolled, 96 % completion rate.<br>• Strong business plan development, implementation and measurable financial return - 119 teams completed the programme, 22 % of teams had fully implemented their business plans, 38 % generating revenue from plans. |

(*continued on next page*)

**Table 1** (*continued*)

| Authors (Year) | Country | Aim/Objective | Methodology | Sample | Leadership intervention description | Leadership outcomes measured | Main Findings & Conclusions |
|---|---|---|---|---|---|---|---|
| **Orton et al. (2023)**[35] | USA | Evaluation of the Emerging Leaders in Public Health (ELPH) initiatives impact on leadership competencies and agency transformation | Mixed methods<br>Likert-style post-programme survey, external observer multi-component report and survey with close-ended and narrative questions | n = 93<br>3 successive ELPH programme cohorts 2014–2019 | 16–18 month ELPH leadership initiative. Includes multi-day residential meetings, coaching, educational webinars, small group action learning, financial support for individual leadership development | Self-report and external observation of ELPH graduates leadership skill change and development over time, observable workplace impact based on the 5 adaptive leadership framework categories | • Strong financial gain/impact - collectively generated over $6 million in enhanced revenue (positive return on investment).<br>• Large or very large positive impact on their leadership (88 %)<br>• Skills gained were still in use 24–36 months later. (81 %)<br>• Self-reported gains most pronounced in active listening (82 %), self-awareness of strengths and limits as a leader (78 %), inspiring & influential communication (75 %), seeking external learning opportunities (75 %), and building relationships with diverse collaborators (73 %).<br>• Peer assessments: 78 % large impact (collaboration, vision-setting and influence).<br>• External colleagues: 93 % positive leadership growth, 72 % improved crisis leadership.<br>• Observers: enhanced strategic planning, more inclusive work culture and greater reliance on data-driven decision-making.<br>• Pairing a senior leader with an emerging leader identified as a major strength. |

which were published between 2007 and 2025. Studies were conducted across a range of continents: North America (n = 11), Africa (n = 4), Europe (n = 3), Australia (n = 1) and a multi-continental setting (n = 1). Sample sizes ranged from 7 participants in small group settings[27] to more than 1500 in large national organisation settings.[28] Four broad categories of leadership development interventions were identified: (1) Formal academic or institute-based programmes (e.g. post-graduate public health programmes); (2) mentorship and coaching models; (3) entrepreneurial and action-learning approaches; and (4) systems-level workforce development strategies. Intervention settings varied in size and prominence[28–31] and included a range of career stages.[32–37]

### 3.3. Risk of bias & study quality assessment

The reporting of some studies' methodologies was limited, rendering it difficult to assess their risk of bias for some domains, this uncertainty would accordingly increase the severity of their potential risk of bias, as per ROBINS-I V2 guidance.[25] Based on our informal assessment, most studies were likely to be at serious risk of bias due to confounding arising because confounding factors were not measured or not included in the analysis. Some studies were likely to be at serious risk of selection bias because the start of follow up and start of intervention were not the same for all participants. Finally, many studies were likely to be at serious risk of bias due to missing data, with missing data often likely to be related to the true value of the outcome (e.g. impact of the leadership intervention) and with no imputation performed.

Our informal assessment of quality suggested significant quality and methodological variations among studies, including a range of leadership definitions, and the use of a wide range of outcomes and methodologies rendering comparison between groups difficult.

### 3.4. Reported outcomes

This review synthesises the evidence focussed on 3 main outcome sub-groups: (1) individual-level; (2) organisational-level; and (3) systems-level. The quality and risk of bias concerns, make definitive conclusions impossible. However, the studies included in this review suggest evidence of diverse leadership development interventions which consistently demonstrated positive effects of leadership development interventions at the individual level, with mixed or limited evidence on organisational and systems-level outcomes or population health outcomes. Interventions seem to be moving toward multi-level initiatives that blend several unique interventions into larger context-sensitive programmes and courses to deliver the best outcomes.[28,30,35,36,42] More recently, particularly in light of the COVID-19 pandemic, the expansion of equity-oriented and digital interventions [30–33,38,45] show possible evidence of improved access to leadership development resources and reframed public health leadership to incorporate diversity, inclusion and resilience.

#### 3.4.1. Individual-level outcomes

Participants reported improved proficiency across a variety of leadership capabilities including public health knowledge and skills ,[30,28,35,36,42], self-efficacy,[31,40,44] and behavioural leadership practices such as communication,[46,44] problem solving and conflict management.[35,37,44,41] Resilience and wellbeing benefits were reported.[27,44,41] Evidence of sustained leadership development was suggested by Olson (2013)[46] and Orton (2023),[35] whose participants demonstrated leadership outcomes 2 years later.

Coaching and mentoring appeared particularly effective at enhancing reflective practice, confidence, team building, leadership identity and advocacy skills.[35,37,42,45,43,40,44] Several authors reflected that resource constraints[29] and staff attrition[33,38,40] are of concern. Notably, almost half (49 %) of Dean et al. (2021)[44] coaching recipients expressed difficulties in completing the coaching portion of their multi-level leadership development initiative. Participants gained benefit from brief, 10-min "speed mentoring" initiatives.[28]

Identity-related initiatives seemed to expand participants' views and fostered empowerment.[27,38] The Minority Leadership Programme (MLP) initiative was reported to contribute to one participant's progression: "*Since MLP, I have been promoted twice […] MLP equipped me with tools that allow me to be confident yet humble, I now take a seat at the table and my presence is known and respected*" ([38], p491).

#### 3.4.2. Organisational-level outcomes

Organisational-level changes were reported in programmes that embedded leadership within workforce strategy and culture, such as Peel Public Health's organisation-wide workforce capacity development strategy[43] and the CDC's National Center for HIV, Viral Hepatitis, STD, and Tuberculosis suite of Workforce Development and Capacity Building initiatives.[28]

The CDC-funded national Emerging Leaders in Public Health (ELPH) programme[36] incorporates multiple interventions, including guided public health business plan development. From an initial $2million investment, programme alumni had actively generated nearly $4million in revenue through their operational business plans, with further revenue predicted. A modernised iteration of the same programme[35] directly linked individual development with agency-wide transformation and innovations, stating that: "*Leadership development and agency transformation are synergistic*" ([35], p1).

Cusack et al.[27] concluded that engaging the public health nursing workforce in co-developing a shared vision and future plans fostered empowerment and alignment between frontline nursing practice and organisational priorities. A pandemic-focussed, team-based, blended learning leadership programme across six African and South American nations[34] reported significant increases in accountability, strengthened co-ordination and improved organisational outbreak preparedness overall.

#### 3.4.3. System-level outcomes

System-level impacts were mostly descriptive and evidence of direct population health outcomes was sparse. The global Leading and Managing for Results in Pandemics (LMRP) programme,[34] a team-based, blended learning programme, reported adaptability and resilience through improved pandemic response preparedness. Amde et al.,[33] through regional blended MPH programmes, aligned academic training with national health system needs in four African health ministries, reporting institutional and cross-country health workforce capacity building in management, policy, planning, research, training and curriculum development.

Through an evidence-driven leadership and capacity development programme, Bryant & Ward[43] reported system-level outcomes by embedding a competency framework across a regional Canadian public health workforce, prioritising leadership pipelines, aligning staff roles with organisational needs and supporting staff retention. Dean et al.[28] reported integration of leadership development into agency-wide strategies, aligning human factors such as staff motivation and supervisor support with organisational goals.

In the context of the global COVID-19 pandemic, one participant suggested such a change post-programme: "Both participants immediately implemented their training in the City's response to the COVID-19 pandemic. I believe their ELPH training was instrumental in keeping our COVID-19 cases/deaths low in relation to our neighbors." ([35], p926). One LMRP programme participant described applying the principles and practices of the leadership programme to improve their county-level Department of Health teamwork, leading to a 6.7 % rise in COVID-19 vaccination coverage.[34]

Some of Orton et al.[36]'s business plans also appeared to translate into tangible improvements in service access, such as a mobile dental van that delivered an additional 1600 dental appointments in its first operational year. Through strengthened leadership and management in rural DRC health zones, Bigirinama et al.[29] reported increased utilisation of

**Table 2**
Definitions of leadership and use of psychological theory.

| Authors (Year) | Definition of Leadership Used | Assessment of Use of Psychological Theory in Introduction or Methods *(0 = no or indirect mention of models or theories; 1 = Theory/model of behaviour mentioned; 2 =Targeted construct mentioned as predictor of behaviour)* adapted from Michie & Prestwich 2010[16] | Comment on Use of Psychological Theory |
|---|---|---|---|
| **Amde, Sanders & Lehmann (2014)**[32] | Not defined. | 0 | No mention of psychological theory. |
| **Amde, Van Houweling & Van Herten (2019)**[33] | Not formally defined, refers to the WHO's leadership and development framework in low-income countries (2007)[a]. | 0 | No mention of psychological theory. |
| **Amutah-Onukagha et al. (2023)**[38] | Not defined. | 0 | No mention of psychological theory. |
| **Barbina et al. (2025)**[39] | The framework proposed by Czabanowska et al. (2014) (9) on public health leadership competencies. | 0 | No mention of psychological theory. Applied psychological theory referred to. |
| **Belcher et al. (2019)**[40] | Bass and Riggio (2006) Transformational leadership model[b]. | 0 | No mention of psychological theory. Applied psychological theory referred to. |
| **Bhimani, Roitenberg & Suarly (2021)**[37] | The LEADS Framework is based on the idea that an individual can demonstrate effective leadership in five actionable domains.[c] | 0 | No mention of psychological theory. Applied psychological theory referred to. |
| **Bigirinama et al. (2024)**[29] | Not defined. | 0 | No mention of psychological theory. Applied psychological theory referred to. |
| **Black et al. (2022)**[31] | Not formally defined. 'Each week focuses on a different topic: defining leadership; emotional intelligence; leadership styles; teamwork; communication; decision-making; and feedback.' | 0 | No mention of psychological theory. Applied psychological theory referred to. |
| **Blanchard & Carpenter (2012)**[41] | Not formally defined, refers to the WHO's leadership and development framework in low-income countries (2007)[d]. | 0 | No mention of psychological theory. Applied psychological theory referred to. |
| **Brandert et al. (2022)**[42] | New frameworks and recommendations for training and retaining the current workforce have been developed, focused on leadership and systems thinking skills (various references[e]). | 0 | No mention of psychological theory. Applied psychological theory referred to. |
| **Bryant & Ward (2017)**[43] | Not defined. | 1 | Refers to psychological theories of change (Kotter's Leading Change Theory; May's Normalization Process Theory). |
| **Carbone et al. (2025)**[34] | Management Sciences for Health, Leading and Management Framework & Critical Competencies for Health Systems Strengthening[f]. | 0 | No mention of psychological theory. Applied psychological theory referred to. |
| **Chêne et al. (2025)**[30] | The course aligned with a comprehensive reference framework (Czabanowska et al., 2014)[8] covering essential leadership competencies. | 0 | No mention of psychological theory. Applied psychological theory referred to. |
| **Cusack et al. (2018)**[27] | Not defined. | 1 | Refers to psychological theories of change (Participatory Action Research). |
| **Dean et al. (2014)**[28] | Not defined. | | |
| **Dean et al. (2021)**[44] | Leadership in public health is defined as "creativity in action" and "requires the fortitude and flexibility to put vision into action." (Rowitz 2018)[g]. | 0 | No mention of psychological theory. Applied psychological theory referred to. |
| **O'Connell, Stoneham & Saunders (2016)**[45] | Not defined. | 0 | No mention of psychological theory. Applied psychological theory referred to. |
| **Olson (2013)**[46] | Five practices identified by Kouzes and Posner (2002) as necessary for exemplary leadership[b]. | 0 | No mention of psychological theory. Applied psychological theory referred to. |
| **Orton et al. (2007)**[36] | Competency in civic entrepreneurship is the ability to combine skills, including assessing needs, marshalling human and other resources, building strategic alliances, using evidence-based planning processes, attracting start-up funds, identifying revenue streams, and planning, for postgrant sustainability. (Authors' definition). | 0 | No mention of psychological theory. Applied psychological theory referred to. |
| **Orton et al. (2023)**[35] | An "adaptive leadership" framework was used to guide the development of the ELPH curriculum under discussion here. (Authors' definition). | 1 | Refers to psychological theories of change (Individual Goal Setting, classified in Michie et al.'s behaviour change taxonomy, 2013)[24] |

[a] WHO. Towards better leadership and management in health: Report on an international consultation on strengthening leadership and management in low-income countries, 29 January-1 February 2007, vol. 2007. Geneva: World Health Organization.

[b] Bass, B. M., & Riggio, R. E. (2006). Transformational leadership. New York, NY: Psychology Press.

[c] Canadian College of Health Leaders. (2013). Branches of knowledge: Comprehensive articles on leadership (LEADS in a caring environment).

[d] WHO. Towards better leadership and management in health: Report on an international consultation on strengthening leadership and management in low-income countries, 29 January-1 February 2007, vol. 2007. Geneva: World Health Organization.

[e] Desalvo KB, Wang YC, Harris A, Auerbach J, Koo D, O'Carroll P. Public health 3.0: a call to action for public health to meet the challenges of the 21st century. Prev Chronic Dis. 2017; 14:E78. 14. de Beaumont Foundation & National Consortium for Public Health Workforce Development. Building skills for a more strategic public

health workforce: a call to action; Fraser M, Castrucci BC. Beyond the status quo. J Public Health Manage Pract. 2017; 23(5):543–551. 16. Grimm B, Ramos AK, Maloney S et al. The most important skills required by local public health departments for responding to community needs and improving health outcomes. J Community Health. 2021; 47:79–86; Welter C, Barrett KT, Davis S, Lloyd L, Rose B. Creating a learning agenda for systems change: a toolkit for building an adaptive public health workforce public health training centers. https://publichealthlearningagenda.org/wp-content/uploads/2020/12/Learning-Agenda-Toolkit-Report-Final-120920.pdf. Published 2020.

[f] Management Sciences for Health, Leading & Managing Framework, ⟨https://msh.org/wp-content/uploads/2021/07/leading-and-managing-framework_0_0.pdf; Management Sciences for Health, Leading and Managing: Critical Competencies for Health Systems Strengthening, ⟨https://msh.org/wp-content/uploads/2015/09/2015_08_msh_leading_managing_critical_competencies.pdf⟩, 2014.

[g] Rowitz L. Essentials of Leadership in Public Health. Burlington, MA: Jones & Bartlett Learning; 2018.

[h] Kouzes JM, Posner BZ. The Leadership Challenge. San Francisco, CA: Jossey-Bass; 2002.

curative health services, though not sustained post-programme.

### 3.5. Definitions of leadership and use of psychological theory

Table 2 summarises study definitions of leadership and use of psychological theory.

Eight studies did not reference any definition or model of leadership.[27,29,31,32,38,43,44,41] Two studies[33,41] referred to a WHO report on leadership and development in low-income countries,[47] and two studies[30,39] referenced the European public health leadership competency framework.[9] The remaining eight studies reported a definition or model unique to their programme.[34–37,42,40,44,46]

The use of underlying psychological theory was limited. Three studies directly mentioned psychological theory in the introduction or methods sections,[27,35,43] though these were different between each study. Three studies made no reference to theory or models,[32,33,38] and the remaining 14 made indirect reference to psychological concepts such as ‘emotional intelligence’ and ‘transformational leadership’.

## 4. Discussion

To the authors' knowledge, with the exception of Li et al.’s scoping review of pre-covid public health emergency response leadership,[7] this is the first systematic review to summarise the evidence around methods of general public health leadership development. We found 20 relevant studies covering a range of settings, continents, career stages, and a diverse range of interventions. Definitions of leadership were either missing or disparate, which may reflect the lack of consensus and different global contexts of public health leadership. In keeping with findings from other behavioural interventions,[16] leadership development generally[3,4] and healthcare leadership specifically,[4] despite positive findings, we found a paucity of direct use of psychological theory.

### 4.1. Limitations

We did not formally assess the quality of studies or risk of bias, and are unable to draw definitive conclusions, however we found that interventions appear to be evolving toward multi-level initiatives, blending several unique interventions into larger context-sensitive programmes and courses to deliver the best outcomes. We observed an expansion of equity-oriented and digital interventions, as well as the reframing of public health leadership to incorporate diversity, inclusion and resilience. Retention challenges, particularly in low- and middle-income contexts, were recurrent themes, with trained leaders often moving to international or private organisations for improved conditions. Our findings are less conclusive than the healthcare literature (for example, Phillipson et al.’s systematic umbrella review[4]), which may reflect a less developed evidence-base for public health leadership, as well as discipline and context-specific needs.

The review's limitations include the lack of full risk of bias or quality assessments. We selected studies in the English language only, and did not conduct forward or backward reference searches or grey literature searches. Evidence quality was limited by reliance on uncorroborated self-reported measures, small or varied sample sizes, short-term follow-up and lack of data, and few studies assessed population health outcomes or sustainability beyond immediate programme completion.

There are significant challenges involved in evaluating public health leadership interventions, including securing funding, methodological issues, and evaluating the impact at system or population health levels. Considering future priorities, given the importance of effective public health leadership for population health, we believe clarity on effective educational methods and programme elements is needed.

In line with Michie & Prestwich,[16] we recommend that those developing and evaluating public health leadership interventions explicitly use psychological theory in their pedagogy, including: mentioning models and theories which explain or predict behaviour; presenting psychological constructs' relationship to behaviour change in the introduction or method sections (not discussion); using psychological theory to select recipients, select and develop interventions; tailoring interventions to recipients. We also recommend the greater use of more standardised and higher level outcomes using Kirkpatrick's framework.[48]

Future research should include greater use of multi-source data to corroborate self-reported outcomes; reduction of the potential for inequities in access to leadership development interventions; increased use of longer-term assessments given time is needed for developing leaders; the assessment of value; and methods to address, as well as avoid, the ‘dark side of leadership’ given the increased prevalence of psychopathy in leadership roles.[3] We also recommend research to understand supportive system contexts for public health leaders to work in, focus on leader wellbeing, and greater interest in this field. All these recommendations will be challenging given the varied contexts and career stages of public health leaders globally, and the dynamic and rapidly evolving demands placed upon them.

### 4.2. What this study adds

No previous systematic review on this topic exists. Our review revealed 20 studies and a disparate and underdeveloped evidence-base for public health leadership; use of underpinning psychological theory was rare. There is a lack of clarity on effective educational methods and programme elements. Effective public health leadership development may be less about isolated interventions and more about ecosystems that combine training, coaching, team practice and organisational alignment, underpinned by improving equity and digital accessibility.

### 4.3. Implications for policy and practice

We believe that greater rigour must urgently be applied to the practice of developing public health leadership. Further research and collaboration must also be undertaken to strengthen the existing evidence base for leadership development, including for different career stages and contexts. This must be based on underlying psychological theory. We recommend future studies of interventions are reported using standardised outcome measures, assessments of value, and the degree of system support for prospective leaders. Greater interest in this

field could be achieved through collaborations of academic, professional and alumni networks and partnerships.

### 4.4. Conclusions

Across these 20 studies, effective public health leadership development appears to be less about isolated interventions and more about ecosystems that combine training, coaching, team practice and system alignment, underpinned by improving equity and digital accessibility. We are concerned about the disparate and underdeveloped state of the evidence, and the paucity of use of psychological theory in public health leadership development. At this time of significant challenge to the discipline, we hope this review serves as an urgent call to action to the global public health community.

From our understanding of the psychology literature, we believe that Coaching Psychology, a psychological discipline which focuses on workplace performance and wellbeing is likely to be well placed to provide relevant theories to underpin leadership development.[49] Public health is underpinned by a rigorous commitment to evidence-based practice:[50] we believe that it is time to apply the same rigour to the practice of developing public health leadership to best address the complex health and societal challenges we face.

## Ethical statement

None as systematic review.

## Author contributions

Fiona Day – conceptualisation & initiation, development of initial protocol, title & abstract screening, full article screening, methodology, data extraction, drafting discussion, conclusions, reviewing and editing of final journal article, oversight and management of development of journal article, abstract.

Vicky Snape – wrote & submitted final protocol, title & abstract screening, full article screening, drafting introduction, methodology, conclusion, recommendations.

Dhanya Gardner - title & abstract screening, full article screening, introduction, methodology.

Michael Dalili - title & abstract screening, full article screening, risk of bias assessment, review and final editing of journal article.

Cecilia Vinchenzo - title & abstract screening, full article screening, data extraction, methodology, results section, bias assessment, review and final editing of journal article.

Sophie Baird - developed initial protocol, title & abstract screening, review and final editing of journal article. Kalu Udu – title & abstract screening, full article screening.

Jim McManus – development of initial protocol, full article screening, oversight and management of development of journal article.

## Funding

Fiona Day Consulting LTD paid for Covidence License and independent librarian search.

## Declaration of competing interests

Fiona Day is Director, Fiona Day Consulting. England & is Guest Editor of Public Health Special issue on Psychology and Public Health. Provided funding for the review as outlined; no other competing interests declared.

Jim McManus is Guest Editor of Public Health Special issue on Psychology and Public Health. No other competing interests declared.

All other authors report no competing interests.

## Acknowledgements

Paul Lackey, Independent Librarian; Daryl O'Connor, Professor of Psychology, University of Leeds for advice on theory coding schemes.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.puhe.2026.106178.

## References

1. McKee M. Seven goals for public health training in the 21st century. *Eur J Public Health*. 2012 Oct 23;23.
2. Osti T, Gris AV, Corona VF, et al. Public health leadership in the COVID-19 era: how does it fit? A scoping review [Internet] *BMJ Lead*. 2024 Jun 1;8(2). Available from: https://bmjleader.bmj.com/content/8/2/174. Accessed February 18, 2025.
3. Day DV, Riggio RE, Tan SJ, Conger JA. Advancing the science of 21st-century leadership development: theory, research, and practice [Internet] *Leadersh Q*. 2021 Oct 1;32(5), 101557. Available from: https://www.sciencedirect.com/science/article/pii/S104898432100062X. Accessed September 16, 2025.
4. Phillipson J, Pinto AC, Kingsley-Smith H, Krachler N, McGivern G, Lyons O. Leadership training in healthcare: a systematic umbrella review [Internet] *BMJ Lead*; 2025 Jun 17. leader-2025-001269. Available from: http://bmjleader.bmj.com/content/early/2025/06/16/leader-2025-001269.abstract.
5. Carlton E, Holsinger J, Riddell M, Bush H. Full-range public health leadership, part 1: quantitative analysis. *Front Public Health*. 2015 Apr 30;3.
6. Rodríguez-Feria P, Flórez LJH, Czabanowska K. Leadership competencies for knowledge translation in public health: a consensus study. *J Public Health*. 2022 Dec 1;44(4):926–935. https://doi.org/10.1093/pubmed/fdab286 [Internet] . Accessed February 18, 2025.
7. Li Y, Hsu EB, Pham N, Davis XM, Podgornik MN, Trigoso SM. Developing public health emergency response leaders in incident management: a scoping review of educational interventions. *Disaster Med Public Health Prep*. 2022 Oct;16(5):2149–2178.
8. Institute of Medicine. *The Future of Public Health*. Washington DC: National Academy Press; 1988.
9. Czabanowska K, Smith T, Könings KD, et al. In search for a public health leadership competency framework to support leadership curriculum-a consensus study. *Eur J Public Health*. 2014 Oct;24(5):850–856.
10. Faculty of Public Health. Public health specialty training curriculum [Internet] Available from: https://www.fph.org.uk/media/4ojeo5bk/public-health-curriculum-2022-v13_final.pdf; 2022.
11. McKee M. The attributes of public health leadership. *Eur J Public Health [Internet]*. 2025 Mar 1;35(suppl ment_2). ii1–4. Available from: https://academic.oup.com/eurpub/article/35/Supplement_2/ii1/8092267. Accessed September 22, 2025.
12. World Health Organisation. Defining essential public health functions and services to strengthen national workforce capacity. Available from: https://www.who.int/publications/i/item/9789240091436. Accessed May 8, 2025.
13. World Health Organisation. Global competency and outcomes framework for the essential public health functions. Available from: https://www.who.int/publications/i/item/9789240091214. Accessed May 8, 2025.
14. Wang Q, Lai YL, Xu X, McDowall A. The effectiveness of workplace coaching: a meta-analysis of contemporary psychologically informed coaching approaches. *J Work-Appl Manag*. 2021 Jan 1;14(1):77–101. https://doi.org/10.1108/JWAM-04-2021-0030 [Internet] . Accessed April 22, 2022.
15. Avolio BJ, Hannah ST. Developmental readiness: accelerating leader development. Consult Psychol J Pract Res [Internet]. [cited 2022 June 15];60(4):331–347. Available from: https://doi.apa.org/doiLanding?doi=10.1037%2F1065-9293.60.4.331.
16. Michie S, Prestwich A. Are interventions theory-based? Development of a theory coding scheme. *Health Psychol Off J Div Health Psychol Am Psychol Assoc*. 2010 Jan;29(1):1–8.
17. Salicru S. A new model of leadership-as-practice development for consulting psychologists. *Consult Psychol J Pract Res*. 2020;72(2):79–99.
18. Glanz K, Rimer BK. *Theory at a Glance: A Guide for Health Promotion Practice*. second ed. USA: Public Health Service. National Cancer Institute, NIH, U.S. Government Printing Office; 2005.
19. PRISMA statement [Internet]. [cited 2025 February 20]. PRISMA 2020 explanation & Elaboration. Available from: https://www.prisma-statement.org/prisma-2020-explanation-elaboration.
20. PRISMA statement [Internet]. [cited 2025 September 16]. PRISMA statement. Available from: https://www.prisma-statement.org.
21. Snape V, Day FJ, Dalili M, et al. Prospero international prospective register of systematic reviews. [cited 2025 September 16]. Evidence-based public health leadership development: a systematic review protocol. Available from: https://www.crd.york.ac.uk/PROSPERO/view/CRD420251071796.
22. Bond University. Queensland, Australia; Systematic Review Accelerator: Deduplicator (relaxed algorithm), 2024. Available: https://www.sr-accelerator.com/#/deduplicator.
23. Veritas Health Innovation. Melbourne, Australia; Covidence systematic review software, 2024. Available: https://www.covidence.org/.

24. Michie S, Richardson M. Johnston M.,et al. The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behavior change interventions. *Ann Behav Med*. 2013; 46(1):81–95.
25. Risk of bias tools - ROBINS-I V2 tool [Internet]. [cited 2025 September 16]. Available from: https://www.riskofbias.info/welcome/robins-i-v2.
26. Barnett-Page E, Thomas J. Methods for the synthesis of qualitative research: a critical review. *BMC Med Res Methodol [Internet]*. 2009 Aug 11;9:59. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3224695/. Accessed September 16, 2025.
27. Cusack C, Cohen B, Mignone J, Chartier MJ, Lutfiyya Z. Participatory action as a research method with public health nurses. *J Adv Nurs*. 2018;74(7):1544–1553. Available from: https://www.ncbi.nlm.nih.gov/pubmed/29489024.
28. Dean HD, Myles RL, Spears-Jones C, Bishop-Cline A, Fenton KA. A strategic approach to public health workforce development and capacity building. *Am J Prev Med*. 2014;47(5 Suppl 3):S288–S296. Available from: https://www.ncbi.nlm.nih.gov/pubmed/25439247.
29. Bigirinama R, Bisimwa G, Makali S, et al. Mentorship to strengthen health system leadership: a case study of the Walungu rural health zone in the eastern Democratic republic of Congo. *PLOS Glob Public Health*. 2024;4(12), e0003354. Available from: https://www.ncbi.nlm.nih.gov/pubmed/39666718.
30. Chêne G, Spahic M, Breda J, Czabanowska K. Developing evidence-based, values-driven skills: WHO-ISPED European public health leadership course 2023. *Eur J Public Health*. 2025 Mar 25;35(suppl 2). ii7–8. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC11933793/. Accessed September 18, 2025.
31. Black A, Utunen H, Crowder R, et al. Digitalizing who's health emergency leadership training during the pandemic. *Stud Health Technol Inf*. 2022;298:161–162. Available from: https://www.ncbi.nlm.nih.gov/pubmed/36073477.
32. Amde WK, Sanders D, Lehmann U. Building capacity to develop an African teaching platform on health workforce development: a collaborative initiative of universities from four sub Saharan countries. *Hum Resour Health*. 2014 May 30;12(1):31. https://doi.org/10.1186/1478-4491-12-31 [Internet] . Accessed September 18, 2025.
33. Amde WK, Marchal B, Sanders D, Lehmann U. Determinants of effective organisational capacity training: lessons from a training programme on health workforce development with participants from three African countries. *BMC Public Health*. 2019 Nov 26;19(1):1557. https://doi.org/10.1186/s12889-019-7883-x [Internet] . Accessed September 18, 2025.
34. Carbone NB, Alberto N, Henderson K, et al. Use of outcome harvesting to understand the outcomes of a COVID-19 pandemic leadership and management program in six countries. *Eval Program Plann*. 2025 Aug 1;111, 102619. Available from: https://www.sciencedirect.com/science/article/pii/S0149718925000862. Accessed September 18, 2025.
35. Orton S, Schenck AP, Suttie J, et al. The emerging leaders in public health initiative: individual leadership transformation. *J Public Health Manag Pr*. 2023;29(6): 922–928. Available from: https://www.ncbi.nlm.nih.gov/pubmed/37290130.
36. Orton S, Umble K, Zelt S, Porter J, Johnson J. Management academy for public health: creating entrepreneurial managers. *Am J Public Health*. 2007;97(4):601–605. Available from: https://www.ncbi.nlm.nih.gov/pubmed/17329658.
37. Bhimani H, Roitenberg J, Suarly M. Promising practices: triple M-A coaching and mentorship program for public health leadership development. *Health Promot Pr*. 2021;22(3):304–308. Available from: https://www.ncbi.nlm.nih.gov/pubmed/32667222.
38. Amutah-Onukagha N, Gifuni-Koutsouris J, Assan MA, Bryant C, Galvan R. An evaluation of the successes of the NASTAD minority leadership program and its implications for leadership in state health departments. *J Public Health Manag Pr*. 2023;29(4):487–495. Available from: https://www.ncbi.nlm.nih.gov/pubmed/36867497.
39. Barbina D, Breda J, Mazzaccara A, et al. Competency-based and problem-based learning methodologies: the WHO and ISS European Public health leadership course. *Eur J Public Health*. 2025 Mar 1;35(suppl ment_2). ii21–8. Available from: https://academic.oup.com/eurpub/article/35/Supplement_2/ii21/8092273. Accessed September 18, 2025.
40. Belcher HME, Piggott DA, Sanders RA, Trent M. Research accountability groups and mentoring minutes: the M(3) approach to promote public health infectious diseases research for diverse graduate students. *Am J Orthopsychiatry*. 2019;89(3):390–399. Available from: https://www.ncbi.nlm.nih.gov/pubmed/31070424.
41. Blanchard CP, Carpenter B. Experiences of action learning groups for public health sector managers in rural KwaZulu-Natal, South Africa. *Rural Remote Health*. 2012; 12:2026. Available from: https://www.ncbi.nlm.nih.gov/pubmed/22891607.
42. Brandert K, Alperin M, Lloyd LM, et al. Learning to lead: 3 models to support public health leadership development. *J Public Health Manag Pr*. 2022;28(5 Suppl 5): S203–S211. Available from: https://www.ncbi.nlm.nih.gov/pubmed/35867490.
43. Bryant B, Ward M. A strategic approach to workforce development for local public health. *Can J Public Health*. 2017;108(4):e403–e408. Available from: https://www.ncbi.nlm.nih.gov/pubmed/29120312.
44. Dean HD, Myles RL, Porch T, Parris S, Spears-Jones C. Changing leadership behaviors in a public health agency through coaching and multirater feedback. *J Public Health Manag Pr*. 2021;27(1):46–54. Available from: https://www.ncbi.nlm.nih.gov/pubmed/31688734.
45. O'Connell E, Stoneham M, Saunders J. Planning for the next generation of public health advocates: evaluation of an online advocacy mentoring program. *Health Promot J Austr*. 2016;27(1):43–47. Available from: https://www.ncbi.nlm.nih.gov/pubmed/27468984.
46. Olson LG. Public health leadership development: factors contributing to growth. *J Public Health Manag Pr*. 2013;19(4):341–347. Available from: https://www.ncbi.nlm.nih.gov/pubmed/23480897.
47. Towards better leadership and management in health: report of an international consultation on strengthening leadership and management in low-income countries, 29 January -1 February, Accra, Ghana. Available from: https://iris.who.int/items/159f9e32-8140-4622-96e8-ef26b48c49fc. Accessed September 24, 2025.
48. Kirkpatrick D. Techniques for evaluating training programs. *Train Dev J*; 1979. Available from: https://www.semanticscholar.org/paper/Techniques-for-evaluating-training-programs-Kirkpatrick/94aeae449f8daca029c48d209eac53905fdc5162. Accessed June 14, 2022.
49. Palmer S, Whybrow A, eds. *Handbook of Coaching Psychology: A Guide for Practitioners*. 2nd ed. Routledge; 2018. https://doi.org/10.4324/9781315820217.
50. Brownson RC, Baker EA, Deshpande AD, Gillespie KN. *Evidence-Based Public Health*. third ed. Oxford: Oxford University Press; 2018.