Continuous, Person-Centered Digital Precision Health and Wellness: A Structured Narrative Review Informing 10P-Health

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ABSTRACT

Background: Continuous, person-centered digital precision health and wellness aims to complement episodic, illness-triggered care with longitudinal multimodal data, analytical support, and accountable responses. 10P-Health (10PH) is the authors' integrated formulation, organized around ten interdependent principles.

Objective: To examine literature and initiatives relevant to 10PH, identify capabilities, implementation conditions, limitations, and gaps in evidence on connections across principles and measurement-to-response pathways.

Methods: A non-exhaustive structured narrative review used PubMed, IEEE Xplore, Google Scholar, citation searching, and targeted official sources. English-language material from 2013 to 2026 was considered, with earlier seminal work retained for conceptual lineage. Heterogeneous conceptual, empirical, technical, policy, program, and product sources were organized by conceptual development, enabling data and technology, initiatives and products, implementation conditions, and evidence maturity. Source-reported findings were distinguished from author interpretation.

Results: The literature describes population-scale genomic and phenotypic resources, longitudinal multimodal programs, remote-monitoring workflows, digital-twin applications, interoperability approaches, and person- and organization-facing artificial intelligence products. It also identifies governance, privacy, safety, professional workflow, participation, equity, access, and economic evaluation as implementation requirements. The sources generally addressed individual capabilities or bounded workflows; evidence on how these connect across settings into end-to-end measurement-to-response pathways remains fragmented. No reviewed source evaluated 10PH as a complete integrated intervention.

Conclusion: Existing evidence identifies capabilities and implementation conditions relevant to 10PH but does not establish the integrated framework's feasibility, effectiveness, safety, equity, or cost-effectiveness. Future research should prospectively and independently evaluate defined use cases to test how data, validated interpretation, pertinent responses, accountable workflows, and meaningful person participation connect.

KEYWORDS

Longitudinal health data, artificial intelligence, interoperability, data governance, remote monitoring

List of abbreviations

Abbreviation	Meaning
10PH	10P-Health
AI	artificial intelligence
EHR	electronic health record
FHIR	Fast Healthcare Interoperability Resources
P4	predictive, preventive, personalized, and participatory medicine

1. Introduction

1.1 From P4 Medicine to continuous digital precision health

P4 Medicine articulated a shift from reactive disease treatment toward predictive, preventive, personalized, and participatory care [1, 2]. Hood [3] linked this vision to systems medicine, omics, and network models; Flores et al. [4] emphasized systems biology, digital technologies, and individual participation. Later formulations broadened this foundation in different contexts: P5 added a psycho-cognitive dimension [5], P6 a public dimension [6], and P9 pervasive, precise, privacy-preserving, protective, and reasonably priced attributes within networked healthcare [7]. These formulations are related extensions, not a standardized sequence or hierarchy.

Research on longitudinal multi-omics, electronic health record (EHR) integration, digital twins, and remote monitoring illustrates capabilities for risk estimation, individualized interpretation, and follow-up in defined settings [8–11]. Responsible implementation also depends on interoperability, governance, professional workflows, participation, and equity [12–16]. However, evidence that individual technologies, programs, or implementation conditions can support particular functions does not establish that they work together as a coherent health pathway. The extent to which longitudinal data, validated interpretation, pertinent preventive or proactive responses, accountable workflows, and person participation are connected and evaluated across settings remains insufficiently established.

Building on the earlier P4-P9 concepts, Georgi Chaltikyan started using the term 10P-Health in his lectures and public talks in 2019 (Chaltikyan, personal communication, Nov 14, 2019). He subsequently described 10P-Health as the novel "21st-century health and wellness paradigm" [17]. In this review, we use 10P-Health (10PH) as an integrated formulation of continuous digital precision health and wellness that extends attention beyond episodic patient care to people – including those who are currently healthy – across the life course. Its ten interdependent P-principles are Predictive, Preventive, Personalized/Precision, Proactive, Participatory, Pertinent, Pervasive, Permanent, Privacy-Preserving, and Platform-Based. The framework envisages governed use of longitudinal, multimodal information from clinical records, omics, behavior, lifestyle, environment, wearables, home sensors, and other connected sources to support timely interpretation and action. The framework's potential value lies not simply in accumulating data or technologies, but in connecting them to pertinent, validated interpretation and feasible responses while preserving accountability, participation, and privacy. The principles are therefore interdependent: predictive and personalized/precision insights need to inform relevant preventive or proactive action; pervasive and permanent engagement depends on suitable platform infrastructure; and participation

requires privacy protection and accountable governance. Evidence for these elements in isolation does not establish health benefit from an integrated model. As a conceptual vision, it requires use-case-specific validation, professional oversight, safety controls, consent, privacy protection, proportionate data access, equity safeguards, and attention to overmedicalization.

1.2 Aim and scope of the review

This structured narrative review examines international literature, projects, programs, infrastructures, implementations, and selected products relevant to the emergence of continuous, person-centered, digitally enabled precision health and wellness. It synthesizes their purposes, intended users, data sources, functions, implementation status, reported findings, and limitations while considering interoperability, governance, privacy, safety, professional responsibility, participation, equity, access, and evidence maturity.

The review asks which evidence and initiatives inform this vision, what capabilities, implementation conditions, and limitations they reveal, and whether the literature examines how these components connect across principles into integrated measurement-to-response pathways – or leaves these connections insufficiently evaluated. It maps the evidence landscape without testing framework superiority or inferring integrated-model feasibility, effectiveness, safety, equity, or cost-effectiveness from component evidence.

2. Methodology

2.1 Review design and question

This structured narrative review examined literature, projects, programs, infrastructures, implementations, and selected products relevant to continuous, person-centered, digitally enabled precision health and wellness. It asked which sources and initiatives inform this landscape and what capabilities, implementation conditions, limitations, and gaps they reveal for 10P-Health (10PH). The review accommodated heterogeneous conceptual, empirical, technical, policy, program, and product sources. It was interpretive and non-exhaustive; it was not intended to estimate pooled effects, test framework superiority, or establish the feasibility, effectiveness, safety, equity, or cost-effectiveness of integrated 10PH.

2.2 Information sources and searches

PubMed, IEEE Xplore, and Google Scholar were searched. PubMed was searched in April 2026, and IEEE Xplore and Google Scholar were searched in May 2026. Targeted citation searching and official-source updates were completed on 31 July 2026.

Searches targeted English-language sources published from 2013 to 2026; earlier seminal publications were eligible when needed to trace P4 Medicine and related conceptual lineage. Database searching was supplemented by citation searching and targeted examination of official sources for public agencies, research programs, infrastructures, policy or regulatory guidance, and selected products. Official product information was checked against the current vendor pages on 31 July 2026.

Searches were organized into four themes rather than requiring every record to contain all 10PH terms: (1) P4 and related formulations, precision health, personalized healthcare, and Digital Precision Health; (2) longitudinal and multimodal data, omics, EHRs, wearables, remote monitoring, artificial intelligence (AI), digital twins, interoperability, and platform infrastructures; (3) projects, programs, population-scale resources, implementations, and person- or professional-facing products; and (4) governance, privacy, safety, consent, workflow, participation, equity, access, adoption, sustainability, and economic evaluation. The final executed search strings are reported in Appendix 1.

2.3 Eligibility and source selection

Sources were considered when they addressed at least one of four areas: conceptual development of continuous precision health; a digital, clinical, data, or analytical capability relevant to longitudinal, preventive, proactive, personalized, or participatory support; an implementation condition such as interoperability, governance, privacy, safety, workflow, equity, access, adoption, financing, or sustainability; or a named initiative combining materially relevant functions. Eligible source types included empirical studies, reviews, conceptual papers, technical studies with an explicit health or implementation relationship, economic-methods papers, authoritative guidance, official program or infrastructure reports, and official product information. Official sources were used to describe current functions; independent evaluations were prioritized for performance or outcome claims.

Duplicate records were not treated as separate sources. Non-English publications, purely technical performance studies without a health or implementation relationship, clinical studies without a relevant digital or precision-health dimension, and unverifiable promotional material were excluded. Opinion and commentary sources were retained only for identified conceptual contributions or to define an evidence gap. Candidate records were assessed from titles and abstracts or summaries, followed by full texts or documents where required. Supplementary sources followed the same eligibility logic.

Source selection occurred within the framework-development author team, and no reviewer outside that team adjudicated inclusion. A total of 3,986 records were identified through database searches (Google Scholar, PubMed, and IEEE Xplore). After removal of 8 duplicate records, 3,978 records were screened, of which 3,906 were excluded because they lacked direct relevance, were not aligned with the review aim, or showed conceptual overlap. Of 72 reports sought for retrieval, 4 could not be retrieved, and 68 were assessed for eligibility; 22 were excluded because of a non-health/wellness or predominantly technical focus, and 17 because they provided insufficient implementation detail, resulting in 29 studies included from database searching. An additional 8 reports were identified through websites and organizations, of which 3 were excluded as not aligned with the review aim, resulting in 5 further reports. A PRISMA-style-adapted flow diagram summarizing the identification, screening, and inclusion process is provided below (Figure 1).

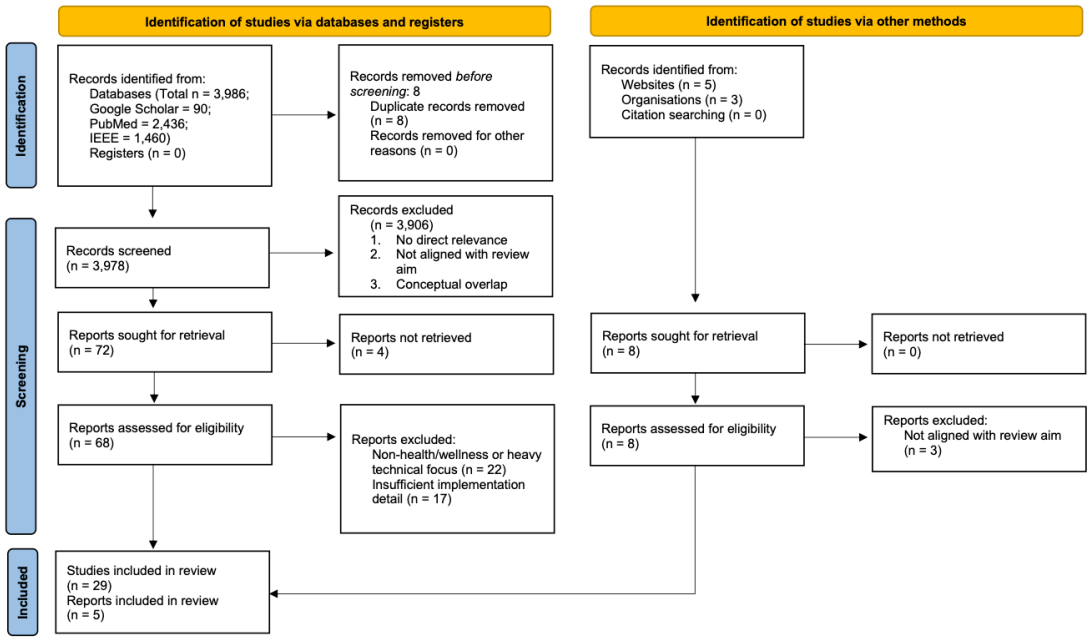


Figure 1: Adapted PRISMA 2020 flow diagram illustrating the study identification and selection process, including records from

databases and other sources, Page, McKenzie, et al., 2021 [18].

2.4 Information organization and narrative synthesis

Information from each retained source or initiative was organized by source type, purpose, intended users or population, setting, data sources, functions, implementation status, methods or design, reported findings, and limitations. Sources were differentiated as conceptual literature; empirical studies and reviews; initiative descriptions; policy or guidance; or official product information.

The narrative synthesis grouped material across conceptual lineage; enabling data and technology; programs, infrastructures, and products; implementation conditions; and evidence maturity and gaps. For presentation, the seven evidence groups summarized in Table 1 were mapped interpretively to the ten 10PH principles and the four thematic Results domains (Sections 3.2–3.5). These mappings were non-exclusive and author-derived: individual sources could inform multiple principles or domains, and the mappings represent the review team's interpretation of relevance rather than classifications used by the original sources or direct validation of the 10PH framework. The narrative synthesis distinguished direct evidence concerning 10PH or a complete integrated model, indirect evidence concerning components or implementation domains, official descriptions, and author-derived interpretation. Heterogeneous source types were not treated as equivalent, and product descriptions were not treated as safety or effectiveness evidence. No meta-analysis or formal risk-of-bias or quality scoring was undertaken because the review question and source types were heterogeneous and the review did not estimate intervention effects.

3. Results

3.1 Evidence landscape and evidence maturity

The reviewed material represented a heterogeneous evidence landscape rather than a single intervention literature. It included population-scale research resources; longitudinal multimodal cohort and wellness studies; reviews of digital twins, interoperability, professional adoption, public attitudes, and economic evaluation; an implementation-effectiveness study of remote symptom monitoring; equity and patient-involvement analyses; authoritative governance guidance; and official descriptions of selected current products. Consistent with the non-exhaustive narrative design, the findings are organized by evidence group and initiative type without numerical aggregation or ranking across unlike source types.

No reviewed source evaluated 10P-Health (10PH) as a complete ten-principle intervention or used the full formulation as an empirical evaluation framework; direct evidence for the integrated model was therefore absent. Table 1 makes explicit the author-derived relationships between the seven evidence groups and the 10PH principles they most directly inform. The four thematic Results domains organize these groups as follows: Section 3.2 covers population-scale research resources and longitudinal multimodal programs; Section 3.3 covers digital twins and monitoring workflows and person- and organization-facing AI products; Section 3.4 covers interoperability and governance and adoption, participation, and equity; and Section 3.5 covers economic evaluation and cross-domain synthesis. These mappings are non-exclusive and indicate conceptual relevance, not classifications used by the original sources or evidence that the corresponding principles have been validated individually or together. The central gap is therefore not simply the absence of individual capabilities, but the limited evidence on whether these capabilities connect into coherent measurement-to-response pathways linking validated interpretation to appropriate action under accountable governance and with meaningful person participation. Empirical studies and program descriptions provide indirect evidence about components or bounded workflows; reviews and guidance identify implementation conditions; and vendor pages describe stated functions and availability. The cross-domain synthesis in Section 3.5 is an author-derived interpretation rather than an empirically tested model.

Evidence group/ 10PH relevance	Representative sources	Reported contribution	Inferential boundary
Population-scale research resources/ Predictive; Personalized/Precision	All of Us Research Program Genomics Investigators (2024) [19]; Bycroft et al. (2018) [20]; Kurki et al. (2023) [21]	Large-scale genomic, phenotypic, longitudinal, and governed research resources support discovery and model development.	Research resources do not establish continuous care, clinical utility, preventive action, or equitable benefit.
Longitudinal multimodal programs/ Predictive; Personalized/Precision; Pertinent; Permanent*	Hou et al. (2020) [22]; Price et al. (2017) [23]; Schüssler-Fiorenza Rose et al. (2019) [10]; Tong et al. (2024) [11]	Repeated clinical, molecular, behavioral, imaging, and activity data can be combined with interpretation or coaching.	Mostly descriptive or non-randomized evidence; comparative effectiveness, long-term safety, access, and value remain unestablished.
Digital twins and monitoring workflows/ Predictive; Preventive*; Personalized/Precision; Proactive; Pertinent; Participatory**	Armeni et al. (2022) [8]; Kaplan et al. (2023) [24]; Riahi et al. (2025) [25]; Rocque et al. (2025) [9]	Reviews describe longitudinal models; one oncology study reports a defined remote symptom-monitoring workflow and outcome associations; commentary identifies monitoring harms that require empirical study.	Definitions and maturity vary; setting-specific, non-randomized findings do not validate an integrated framework, and the frequency of possible harms is not established.
Person- and organization-facing AI products/ Personalized/Precision; Proactive; Platform-Based	Anthropic (2026) [26]; OpenAI (2026a, 2026b) [27, 28]	Official sources describe optional health-data connections, information support, and healthcare-organization offerings.	Vendor descriptions establish stated functions and status, not independent evidence of accuracy, safety, effectiveness, or equity.
Interoperability and governance/ Privacy-Preserving; Platform-Based	Heryawan et al. (2025) [29]; Lehne et al. (2019) [14]; Torab-Miandoab et al. (2023) [30]; World Health Organization (2021) [16]	Layered exchange requirements and ethics, accountability, transparency, inclusion, and human oversight are recurrent conditions.	No single standard or governance configuration is shown to fit every use case or validate 10PH.
Adoption, participation, and equity/ Participatory; Pervasive; Privacy-Preserving	Bertelsen et al. (2024) [12]; Borges do Nascimento et al. (2023) [13]; Chen et al. (2025) [31]; Rao et al. (2024) [15]	Workflow, workforce, attitudes, meaningful influence, access, and distributional effects require explicit attention.	The sources do not show that a service described as 10PH will be adopted, participatory, accessible, trusted, or equitable.
Economic evaluation/ Cross-cutting relevance to Pervasive (access and affordability) and Platform-Based (implementation and maintenance costs)	Gavan et al. (2018) [32]; Gentili et al. (2022) [33]; Love-Koh et al. (2018) [34]; O'Mahony et al. (2015) [35]	Comparator, perspective, uncertainty, implementation cost, and time horizon shape value assessment.	No direct evidence establishes 10PH affordability, budget impact, or cost-effectiveness.

Table 1: Evidence groups relevant to 10PH and their inferential boundaries.

*Note. Source types are heterogeneous. The 10PH mappings are author-derived, non-exclusive indicators of conceptual relevance, not classifications used by the cited sources and not evidence that any individual principle or the integrated framework has been validated. **For remote symptom monitoring, Participatory refers to contributing patient-reported data and does not necessarily imply influence over decisions. *The reviewed sources do not establish preventive health benefit or permanent support across the life course; the links between monitoring and Preventive, and between longitudinal programs and Permanent, are therefore conceptual rather than demonstrated. Product descriptions establish stated functions and release status only; economic sources inform evaluation questions but do not establish 10PH affordability or cost-effectiveness.*

Geographic context varied across the reviewed material and depended on the type of evidence. The principal empirical and infrastructure examples included the United Kingdom (UK Biobank), the United States (All of Us and US-based precision-health and remote-monitoring studies), Finland (FinnGen), and Indonesia (a national FHIR-based interoperability implementation). These examples represent different research and implementation contexts, including population-scale data linkage, longitudinal research cohorts, clinical monitoring, and national interoperability initiatives. Other sources comprised multi-country reviews, global guidance, or vendor descriptions rather than studies conducted within a single national healthcare system.

3.2 Population-scale and longitudinal precision-health infrastructures

Population-scale initiatives showed that genomic, phenotypic, and longitudinal information can be assembled within reusable research infrastructures. UK Biobank enrolled approximately 500,000 participants and combined genomic data with deep phenotyping and linked health information [20]. The All of Us Research Program reported 245,388 clinical-grade genome sequences alongside longitudinal EHR and other phenotypic data; 77% of participants in that analysis were from communities historically underrepresented in biomedical research and 46% were from underrepresented racial and ethnic minority groups [19]. FinnGen linked biobank-derived genotype data with national health-register data through a public-private research partnership [21]. These resources support discovery, model development, linkage, and governed reuse. They are research infrastructures, not evaluations of continuous individual-level care pathways, and they do not establish that data assembly produces timely preventive action or improved outcomes.

Smaller longitudinal programs demonstrated operational combinations of repeated measurements and individualized interpretation. Schüssler-Fiorenza Rose et al. [10] related repeated molecular, clinical, physiological, and behavioral measurements to changing health states. A Human Longevity, Inc. study combined whole-genome sequencing, metabolomics, imaging, laboratory testing, and multidisciplinary review in 1,190 adults [22]. The Pioneer 100 Wellness Project combined genome sequencing, repeated clinical and multi-omic measurements, activity tracking, and health coaching in 108 participants over nine months [23]. A review of multi-omics and EHR integration described analytical methods that could support precision-oriented modelling [11]. These sources show that multimodal data and interpretive functions can be assembled, but their observational, descriptive, or non-randomized designs do not establish comparative effectiveness, long-term safety, accessibility, or cost-effectiveness.

Taken together, these initiatives provide indirect evidence for the informational and longitudinal capabilities envisaged in 10PH. However, these do not demonstrate the full measurement-to-response pathway – from representative data and validated inference to pertinent action, accountable professional workflows, person participation, and sustained preventive benefit – or test how these elements operate together. The association of these infrastructures with particular 10PH dimensions is therefore an author-derived mapping, not a classification used by the source programs; integration of data modalities within a research resource should not be conflated with integration across the ten principles in practice.

3.3 Continuous monitoring, predictive modelling, and person-facing AI

Digital-twin reviews described models that combine person, device, or operational data over time for simulation or decision support, while also reporting heterogeneous definitions, variable validation, and early implementation maturity [8, 25]. These reviews support the relevance of longitudinal modelling but do not establish clinical utility for a common digital-twin intervention. Likewise, analytical capability alone does not show that an estimate is externally valid, understandable, actionable, or linked to a safe response pathway.

Remote electronic patient-reported outcome monitoring offered a more defined measurement-to-response workflow. In a non-randomized hybrid type 2 implementation-effectiveness study of 5,949 people receiving cancer care, 1,392 participants using remote symptom monitoring were compared with

4,557 historical controls. Adjusted analyses associated monitoring with 19% lower hospitalization risk at three months and 13% lower risk at six months; emergency-department and intensive-care use did not differ significantly [9]. The historical comparator, oncology setting, and bounded follow-up limit causal and cross-setting inference. The study evaluates a specific clinical workflow, not 10PH, and any mapping to participatory, pervasive, pertinent, or proactive dimensions is author-derived.

The potential adverse consequences of continuous consumer monitoring remain less mature as an evidence domain. Kaplan et al. [24] called for empirical investigation of possible harms from consumer wearables, including psychological, behavioral, and healthcare-use consequences. This commentary defines a research need; it does not establish the incidence or severity of those outcomes or demonstrate harms caused by 10PH.

Official vendor sources described a newer category of person-facing AI products. As of 31 July 2026, OpenAI reported that Health in ChatGPT was rolling out on web and iOS to logged-in users aged 18 years or older in the United States. The vendor described optional connections to Apple Health and supported medical records for functions such as reviewing results, summarizing changes, identifying trends, and preparing for appointments [28]. Anthropic described opt-in health-record, laboratory, and fitness-data connections for Claude Pro and Max users in the United States, including beta integrations with HealthEx, Function, Apple Health, and Android Health Connect [26]. Both vendors also described organization-facing healthcare offerings [26, 27]. These are official product descriptions, not independent evaluations. Within the reviewed material, they establish stated functions and release status but not diagnostic accuracy, clinical effectiveness, safety, continuity, equitable access, or performance as integrated 10PH implementations. Across these examples, the degree and type of integration differ: digital-twin reviews address longitudinal modelling, remote symptom monitoring evaluates a defined clinical workflow, and vendor sources describe stated product functions. The reviewed material does not establish whether these capabilities can be connected into a validated end-to-end pathway linking reliable interpretation to pertinent responses, assigned responsibility, sustained follow-up, and meaningful person participation.

3.4 Interoperability, governance, participation, and equity

The implementation literature treated interoperability as layered rather than solely technical. Lehne et al. [14] distinguished technical, syntactic, semantic, and organizational interoperability. A review of heterogeneous health information systems identified recurring standards, terminology, architecture, policy, and organizational requirements [30], while a setting-specific analysis of Fast Healthcare Interoperability Resources (FHIR) implementation in Indonesia documented practical design and developer challenges [29]. These sources support the need to preserve meaning and responsibility across systems; they do not show that one standard or architecture is sufficient for all use cases.

Governance evidence extended beyond exchange. World Health Organization guidance identified ethics, human rights, transparency, accountability, inclusion, safety, and human oversight as central to AI for health [16]. Applied to longitudinal and multimodal systems, these are implementation conditions rather than proof of responsible operation. The relevance of controlled access, data stewardship, contestability, and purpose limitation to the Privacy-Preserving and Platform-Based dimensions is an author-derived interpretation. The reviewed guidance did not validate a specific governance configuration for 10PH.

Professional adoption and organizational fit were recurrent workflow constraints. An umbrella review of health professionals' use of digital technologies identified infrastructure and technical problems, workload, psychological barriers, training, perceived usefulness, and organizational support as recurring influences on adoption [13]. The findings show why technical availability cannot be equated with routine use. They do not establish which combination of implementation strategies would be sufficient for a service described as 10PH.

Participation and equity also required distinctions between data contribution, influence, access, and benefit. Bertelsen et al. [12] identified 53 patient-engagement or patient-experience initiatives and resources in regulatory review and health technology assessment; 11% demonstrated integration of both domains. A systematic review of 562 studies on public and patient attitudes toward health-monitoring technologies reported generally positive attitudes alongside geographic and representation gaps and concerns about privacy, affordability, technical errors, burden, and over-reliance [31]. Rao et al. [15] showed how equity-focused implementation frameworks could be applied to population genetic screening. The diversity profile reported by All of Us broadened representation in its genomic resource, but demographic inclusion itself did not demonstrate influence over decisions, equitable access to resulting services, or equitable health benefit [19]. The evidence therefore supports explicit examination of who participates, how influence is exercised, who can use a service, and how benefits and burdens are distributed; it does not show that digitally enabled participation is inherently representative or equitable. Taken together, these findings suggest that interoperability, governance, workforce and organizational readiness, meaningful participation, and equity should be examined as interdependent conditions for implementation rather than as separate requirements assessed in isolation; the reviewed sources do not establish how these conditions should be coordinated within an integrated 10PH pathway.

3.5 Economic evidence and overall synthesis

Economic sources informed evaluation questions rather than a conclusion about 10PH value. Gavan et al. [32] framed the economic case for precision medicine around payer-relevant value and uncertainty. Love-Koh et al. [34] described challenges that precision medicine can create for health technology assessment, and a review found heterogeneous methods and cost-effectiveness findings across digital health interventions, limiting comparison and transferability [33]. O'Mahony et al. [35] emphasized the need for analytic time horizons long enough to capture relevant costs and outcomes. None of these sources evaluated 10PH. The Human Longevity and Pioneer 100 studies likewise did not compare costs and outcomes with usual care or establish affordability, budget impact, or distributional access [22, 23]. Across the evidence groups, the author-derived synthesis identified three linked capability layers. First, longitudinal and multimodal resources – including EHRs, omics, imaging, sensors, and person-reported data – provide an informational basis for risk estimation and individualized interpretation. Second, validation, relevance filtering, accountable escalation, professional workflow, and person involvement are needed to convert information into an appropriate action. Third, interoperability, governance, privacy protection, workforce capacity, continuity across settings, equity, and economic evaluation condition whether that action can be repeated safely and sustainably. Although evidence relevant to each layer appeared across the reviewed material, the layers were not evaluated as a connected system; no source tested whether data resources, decision-to-action processes, and implementation conditions function together to produce sustained health benefit. The three-layer organization is therefore an author-derived synthesis, not an empirically tested model.

The inferential boundary was consistent across initiative types. Convergence among component studies, research resources, reviews, guidance, and product descriptions can identify capabilities and missing links, but it cannot establish that all ten 10PH dimensions are necessary, sufficient, measurable, or superior to a smaller framework. Successful operation in one cohort, specialty, product, or national data environment also cannot establish transferability. The reviewed evidence therefore supports 10PH as an author-proposed requirements map for organizing further inquiry, not as a validated integrated model. A key research priority is to test defined relationships between principles within specific use cases, tracing the pathway from data and validated interpretation through pertinent action and accountable delivery to clinical or wellness outcomes, harms, participation, equity, and costs. Until such evaluation is available, the feasibility, effectiveness, safety, equity, and cost-effectiveness of integrated 10PH remain unestablished.

4. Discussion

4.1 Interpretation of the evidence landscape

The reviewed evidence depicts movement toward continuous, person-centered, digitally enabled precision health and wellness, but not a unified model in routine practice. Public-sector and population-scale research resources assemble genomic, phenotypic, and longitudinal data; cohort and wellness programs combine repeated multimodal measurements with interpretation or coaching; remote monitoring can connect reported data to a clinical response; and official sources describe person-facing interfaces and data connections in selected products [9, 20, 23, 26, 28]. Research infrastructures support discovery rather than continuous care, bounded clinical programs do not establish transferability, and official product descriptions do not demonstrate safety or effectiveness.

For 10P-Health (10PH), the most defensible interpretation is integrative rather than comparative. The ten P-principles are interdependent: the Predictive and Personalized/Precision P-principles require the Pertinent P-principle and a Preventive or Proactive response; the Participatory and Privacy-Preserving P-principles condition legitimate use; and the Pervasive and Permanent P-principles depend on the Platform-Based P-principle. Evidence is more developed for separate capabilities than for their connections within a complete health pathway. In the reviewed material, no source evaluated how representative data, validated inference, pertinent action, accountable professional workflows, meaningful person participation, and sustained follow-up function together or whether their combination improves clinical or economic outcomes. The relationships drawn between these sources and 10PH are therefore author-derived interpretations, not validation of the framework or evidence that it is preferable to earlier formulations. This gap highlights the need for research that examines how relevant principles interact in defined use cases, rather than inferring integrated benefit from the presence of separate components.

4.2 Responsible integration, autonomy, and safety

Turning data into useful support requires more than connectivity. Interoperability must preserve meaning, models need use-case-specific validation, and outputs need uncertainty communication, actionable thresholds, and an identified responder. Digital-twin reviews describe variable definitions and early maturity, while professional adoption is shaped by infrastructure, workload, training, and organizational support [8, 13, 14, 25]. World Health Organization guidance places autonomy, safety, transparency, accountability, inclusion, and human oversight at the center of AI for health [16]. Accordingly, any use of person-facing AI within 10PH should support interpretation and escalation rather than autonomously diagnose or treat; responsibility for alerts and clinical decisions must remain explicit. These safeguards therefore need to be evaluated as part of a connected operational pathway, rather than inferred from the presence of an individual technology, validation step, or oversight policy.

The Privacy-Preserving dimension is a governance requirement, not only a security function. Individuals need understandable choices about which data are used, for what purpose, by whom, and for how long, with proportionate access and workable withdrawal. Continuous monitoring may generate false alerts, false reassurance, anxiety, unnecessary follow-up, professional burden, and overmedicalization. Public-attitude research documents concerns about privacy, errors, burden, over-reliance, and over-treatment, while the prevalence and severity of adverse outcomes remain poorly characterized [24, 31]. These are risks to measure, not outcomes demonstrated for 10PH.

4.3 Participation, equity, trust, and implementation priorities

Participation should mean influence over decisions and data use, not passive data contribution. Representation in a research resource does not itself establish influence, service access, or equitable benefit. Evidence on regulatory and health-technology-assessment processes, population genetic screening, and public attitudes toward monitoring shows that participation, digital access, privacy concerns, and trust

vary across settings and populations [12, 15, 19, 31]. Trust depends on understandable explanations, contestability, accountability, and credible choices. Equity requires representative validation, accessible design, affordability, non-digital alternatives where needed, and analysis of distributed benefits, burdens, and data risks.

Implementation research should begin with a defined use case, comparator, and explicit measurement-to-response pathway, specifying how relevant 10PH principles are operationalized and connected in that context. Evaluation should examine the pathway as a whole, combining clinical or wellness outcomes with model performance, person-reported outcomes, safety, alert burden, autonomy and privacy, workflow effects, participation, equity, and costs; where feasible, studies should also investigate which components and interactions contribute to observed benefits or harms.Vendor-described products require independent evaluation and continued verification as functions change. Policy should enable standards-based exchange and accountable governance without assuming one architecture fits every setting. Economic assessment should include implementation and maintenance costs, perspective, time horizon, budget impact, uncertainty, and distributional effects; current precision-medicine and digital-health evidence cannot establish the value or affordability of integrated 10PH [32–35].

4.4 Limitations

This structured narrative review was interpretive and non-exhaustive. Searching was limited to PubMed, IEEE Xplore, Google Scholar, supplementary searching, and English-language material, so non-English, unpublished, local, or differently indexed sources may have been missed. Although geographic contexts were noted where relevant, geographic representation was not a predefined focus of this review, no comprehensive country-level inventory was compiled during source selection. The findings therefore illustrate selected contexts rather than provide a systematic overview of the geographical distribution of the literature or a comparative assessment of national healthcare systems. Since national data infrastructures, governance arrangements, financing, and care-delivery structures may enable or constrain different components of 10PH, further research should examine these contextual differences more systematically. Narrative selection and synthesis involve judgement, and source selection was conducted within the framework-development team without review by an independent external reviewer. The evidence base combined conceptual publications, empirical studies, reviews, guidance, program descriptions, and vendor sources without formal quality scoring. These materials answer different questions and cannot be treated as one evidence level. Product information changes rapidly, commercial or unpublished systems may be incompletely described, and several initiatives lack independent evaluation. The evidence concerns components and implementation conditions rather than 10PH as an integrated intervention; it cannot establish feasibility, effectiveness, safety, equity, cost-effectiveness, or transferability. Because 10PH was developed within the author team, selection and interpretation may favor coherence with it. Separating source-reported findings from author mapping reduces, but does not remove, this risk.

5. Conclusion

This structured narrative review identified population-scale data infrastructures, longitudinal multimodal programs, remote-monitoring workflows, and vendor-described functions of selected person-facing AI products as capabilities relevant to the continuous, person-centered, digitally enabled precision health and wellness vision associated with 10P-Health (10PH). It also identified interoperability, governance, privacy, professional workflow, participation, equity, safety, and economic assessment as requirements for implementation and evaluation. These capabilities and requirements remain fragmented across resources, clinical programs, guidance, and product descriptions.

Within the reviewed material, no source evaluated 10PH as an integrated intervention. Component evidence therefore cannot establish its feasibility, effectiveness, safety, equity, or cost-effectiveness.

A key next step is to complement component-level research with prospective, independent evaluation of defined use cases that examine how relevant 10PH principles operate together across an end-to-end measurement-to-response pathway. Such studies should specify the comparator and implementation context and evaluate not only clinical or wellness outcomes, but also model performance, safety and harms, autonomy and privacy, professional workload, meaningful person participation, access and equity, and costs. This research should test explicit configurations and interactions rather than assume that all ten principles are necessary or sufficient in every setting.

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Conflict of interest

Georgi Chaltikyan originated the 10P-Health framework examined in this article and serves on the editorial board of the special issue of Journal of Applied Interdisciplinary Research. The authors declare no other conflicts of interest.

Data availability

No new primary data were generated or analyzed. This review is based on the published literature and publicly accessible official sources cited in the article.

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Appendix 1. Search strings

1. PubMed (2013-2026, 2,436 results)

(„10P-Health“[Title/Abstract]
OR „10P Health“[Title/Abstract]
OR „digital precision health“[Title/Abstract]
OR „P4 medicine“[Title/Abstract]
OR „P5 medicine“[Title/Abstract]
OR „precision health“[Title/Abstract]
OR „precision medicine“[Title/Abstract]
OR „personalized medicine“[Title/Abstract]
OR „personalized healthcare“[Title/Abstract]
OR „predictive medicine“[Title/Abstract]
OR „predictive health“[Title/Abstract]
OR „preventive health“[Title/Abstract]
OR „personalized prevention“[Title/Abstract]
OR „participatory health“[Title/Abstract]
OR „proactive health“[Title/Abstract]
OR „pervasive health“[Title/Abstract]
OR „platform-based health“[Title/Abstract]
OR „platform based health“[Title/Abstract])
AND
(„digital health“[Title/Abstract]
OR eHealth[Title/Abstract]
OR „e-health“[Title/Abstract]
OR telehealth[Title/Abstract]
OR telemedicine[Title/Abstract]
OR „health information systems“[MeSH Terms]
OR „electronic health records“[MeSH Terms]
OR „digital twin“[Title/Abstract]
OR „digital twins“[Title/Abstract]
OR „artificial intelligence“[Title/Abstract]
OR „machine learning“[Title/Abstract]
OR wearables[Title/Abstract]
OR „remote monitoring“[Title/Abstract]
OR „patient-generated health data“[Title/Abstract]
OR „patient reported outcomes“[Title/Abstract]
OR interoperability[Title/Abstract]
OR FHIR[Title/Abstract]
OR openEHR[Title/Abstract])
AND
(implementation[Title/Abstract]
OR infrastructure[Title/Abstract]
OR interoperability[Title/Abstract]

OR governance[Title/Abstract]
OR privacy[Title/Abstract]
OR security[Title/Abstract]
OR consent[Title/Abstract]
OR workflow[Title/Abstract]
OR scalability[Title/Abstract]
OR sustainability[Title/Abstract]
OR reimbursement[Title/Abstract]
OR financing[Title/Abstract]
OR „economic evaluation“[Title/Abstract]
OR „cost-effectiveness“[Title/Abstract]
OR „Feasibility Studies“[MeSH Terms]
OR „Program Evaluation“[MeSH Terms]
OR „Cost-Benefit Analysis“[MeSH Terms]
OR „Health Policy“[MeSH Terms])
AND (2013:2026[pdat]) AND english[Filter]

2. IEEE (2018-2026, 1,460 results)

(„precision medicine“ OR „precision health“ OR „personalized medicine“ OR
„digital health“ OR „P4 medicine“ OR „10P Health“ OR „10P-Health“)
AND
(„digital twin“ OR „artificial intelligence“ OR „machine learning“ OR
„internet of medical things“ OR IoMT OR wearable OR „remote monitoring“ OR
FHIR OR HL7 OR openEHR OR interoperability OR „federated learning“)
AND
(healthcare OR clinical OR patient)
AND
(implementation OR architecture OR infrastructure OR scalability OR
governance OR privacy OR security OR feasibility)

3. Google Scholar (2013-2026). Six strings were run separately, and the top 50 relevant records returned by each string were screened.
1 - main feasibility / implementation search
„precision medicine“ OR „precision health“ OR „digital precision health“ „digital health“ implementation governance interoperability feasibility sustainability
2 - 10PH / P4 / conceptual framework search
„10P Health“ OR „10P-Health“ OR „P4 medicine“ „digital health“ framework implementation feasibility
3 - health-data ecosystem / governance search
„health data ecosystem“ OR „European Health Data Space“ „digital health“ governance interoperability privacy consent implementation
4 - economic feasibility / reimbursement search
„precision medicine“ OR „digital health“ „economic evaluation“ reimbursement sustainability implementation feasibility
5 - platform / infrastructure search
„digital health platform“ OR „health information system“ interoperability governance scalability implementation precision medicine
6 - resource-sensitive implementation
„digital health“ implementation feasibility „low resource“ OR „resource constrained“ precision medicine governance interoperability