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RURAL HEALTH LEADERSHIP

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How to author an article for *CJPL*



Deirdre McKennirey

Are you interested in writing an article for *CJPL*? We are always looking for new authors and subject matter related to physician and health care leadership. Check out December's special edition of *CJPL* which focuses on co-leadership experiences with perspectives from both sides of the dyad!

As managing editor of *CJPL*, let me provide an overview of the process once we receive your manuscript, which will have been written following *CJPL*'s Guidelines for Authors. Editor-in-Chief Dr. Abraham (Rami) Rudnick will review it for appropriateness of content and style, including attention to innovation, rigour, impact, and clarity. If he accepts your manuscript, he will provide directional advice regarding how to strengthen content by expanding specific sections, providing concrete examples, or sharpening focus, for example.

Research articles are sent to at least two peer reviewers with relevant expertise, normally chosen from our Editorial Board, although in exceptional cases we look further afield to ensure content is appropriately assessed. This step extends the time before the article is considered for final approval and delivered to our copy editor. Otherwise, articles can generally be turned around in less than a month.

In this issue

Dr. Guaiana and third-year Western University medical sciences student Ms. Wadhawan review synthesized peer-reviewed literature on rural health care leadership to support the position that rural leadership is not an optional administrative function. Read the article to understand their argument that strengthening rural leadership offers a practical strategy to improve

equity, resilience, and continuity of care in underserved communities. In the ninth article in our health economics series, professors Hoch and Dewa determine when simple methods assuming normal distributions can be used to analyze skewed data. In the new Health Informatics section, Jonas Bambi, PhD, and colleagues argue that the future of health care AI should build on, rather than bypass, already accumulated knowledge of health informatics. Equally important, physicians and other clinicians must be partners throughout the AI lifecycle. Consider BC physician John M. Hwang's view that the traditional, largely implicit physician compact with the institutions they serve is no longer valid as he argues that an explicit compact, built through genuine dialogue, is necessary but that the real work lies in determining, concretely, what sustains meaningful physician leadership. Read the assertion of third-year University of Toronto medical student and graduate student in the university's Health Systems Leadership and Innovation program, Eric Hempel, that embedding people leadership development meaningfully in the medical school curriculum offers a critical opportunity to reshape workplace culture, strengthen team cohesion, support staff well-being, and ultimately improve patient care. The issue ends with the third article in our Coaching Corner series covering the use of emotional intelligence to move from overwhelm toward clarity, prioritization, and intentional action.

As always, input on *CJPL*'s content, process, style, and format is very welcome.

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CSPL Coaching Network



Cecile Andreas

MD, MAEOC, MCC, ACTC

Mantra:

You don't get to choose how you're going to die, or when. You can only decide how you're going to live. Now." – Joan Baez

Rural health care leadership in complex systems: a focused review



Giuseppe Guaiana, MD, PhD
Biya Wadhawan

Rural health systems face persistent workforce shortages, geographic barriers, weaker infrastructure, and poorer population health outcomes than urban counterparts. In rural settings, leadership is a critical determinant of service access, safety, and continuity, yet evidence on rural health care leadership remains fragmented. This review synthesizes peer-reviewed literature on this subject across six themes: challenges and leadership styles, crisis leadership, leadership development, workforce and leader well-being, community participation, and competencies and traits. Across studies, rural leaders commonly held overlapping clinical, managerial, and governance responsibilities, often with limited administrative support. This role-stacking increased reliance on reactive problem-solving, although staff frequently valued leaders who were adaptable and change-oriented. Sustained effectiveness depended on balancing flexibility with clear task systems and strong relational practices. During the COVID-19 pandemic, rural organizations demonstrated both fragility and agility: limited redundancy created vulnerability, while short decision chains and cohesive teams enabled rapid adaptation. Effective crisis leadership was associated with transparent communication, flexible governance, staff protection, and community engagement. Leadership development programs were most effective when they were longitudinal, team-based, and embedded in local contexts rather than limited to

short courses. Evidence also showed high levels of burnout and turnover intention among rural leaders, mitigated by greater decision latitude, organizational trust, and value alignment. Community participation was widely endorsed but rarely progressed beyond consultation to genuine, shared authority. Evidence suggests that rural leadership is not an optional administrative function but a core system capability. Health care systems should invest in structured leadership development, decision authority for local leaders, leader well-being, crisis-ready governance routines, and formalized community participation. Strengthening rural leadership offers a practical strategy to improve equity, resilience, and continuity of care in underserved communities.

KEY WORDS: rural leadership; health systems; service delivery

Giuseppe Guaiana, MD, PhD, Biya Wadhawan. Rural health care leadership in complex systems: a focused review. *Can J Physician Leadersh* 12(3): 137-149. <https://doi.org/10.37964/cr24812>.

Rural–urban health care inequities have been documented extensively across high-, middle-, and low-income settings, with rural populations experiencing a greater burden of chronic disease, lower life expectancy, and systematically weaker access to specialist services and enabling infrastructure.¹ The definition of “rural” and “remote” may be challenging. Eckersley defines remoteness as: “a measure of potential disadvantage in receiving timely and equitable care that is related to the geographic location of individual or family residence or of a community.”² In this article, we use the word “rural” to encompass the definition of remote and rural areas.

People living in rural and remote areas experience higher levels of morbidity and mortality,^{3,4} often due to misdistribution of health manpower.^{5,6}

Thin capital bases reinforce rural–urban disparities: aging facilities, travel barriers, lower economies of scale, and enduring challenges in recruiting and retaining clinicians and managers.¹ The gaps may also be widened by urban-centric research systems, in which funding, infrastructure, and evidence generation are concentrated in metropolitan centres; conversely, stronger rural research capacity may help narrow inequities by producing locally relevant evidence for policy, workforce planning, and service redesign.⁷



Leadership is not incidental in this context; it is a core production function of rural health systems. Compared with metropolitan organizations that can distribute managerial functions across dedicated departments, rural services often rely on a small number of individuals who combine clinical duties with administrative management and formal or quasi-formal governance responsibilities.⁸⁻¹⁰

The literature agrees on several contextual constraints that shape how leadership is expressed and perceived in rural organizations. First, resource scarcity and small team sizes amplify the effects, positive and negative, of leadership decisions; there is less buffering of poor choices and often no redundancy in critical roles.⁸ Second, in rural contexts, leadership is exercised in close-knit communities where professional and personal relationships often overlap. Although physicians broadly endorse professional self-regulation, reporting of impaired or incompetent colleagues can be reduced,¹¹ especially in smaller rural systems characterized by close professional relationships and limited formal governance structures. This embeddedness makes trust, fairness, and follow-through particularly salient.^{12,13} Third, the absence of formal managerial scaffolding and leadership pipelines means that many rural leaders learn by doing, with limited access to tailored development and mentorship.^{9,14} These factors help explain why staff in rural clinics frequently perceive a “change-oriented” leadership emphasis; leaders are compelled to adapt, innovate, and improvise under constraints, even as relational and task routines struggle to keep pace.¹⁵ Survey work in low-resource rural primary care settings similarly finds leaders oscillating between transformational practices, which blend vision with relational and task engagement, and control-oriented practices, focused on administrative compliance, with style strongly influenced by experience and the immediacy of operational pressures.¹⁶

The COVID-19 pandemic illuminated these dynamics with clarity. Rapid role shifts, evolving guidance, and precarious supply chains¹⁷ were coupled with emphasis on a unifying mission, rapid upskilling, adaptive decision structures, attention to safety, and community engagement as core leadership work during the emergency.¹⁸ These accounts suggest that the “smallness” of rural units is double-edged: limited redundancy makes them fragile, but short decision chains and cohesive teams make them agile.^{17,18} The implications extend beyond crises. If rural organizations can translate those adaptive routines into non-crisis governance, clear sense-making, flexible resource reallocation, protection of staff well-being, and



First, **resource scarcity and small team sizes amplify the effects**, positive and negative, of leadership decisions; there is less buffering of poor choices and often no redundancy in critical roles.⁸

after-action learning, they can offset structural disadvantages in day-to-day operations.^{17,19}

In this review, we synthesize evidence on rural health care leadership across six themes: challenges and leadership styles; crisis leadership; leadership development; workforce and leader well-being; community participation; and competencies and traits. It prioritizes peer-reviewed studies with demonstrated relevance to rural contexts in Scandinavia, Australia, North America, and sub-Saharan Africa, while drawing on authoritative institutional sources for system-level inequities and workforce distribution patterns.

The objective is to identify important themes about rural leadership, and translate those findings into implementable implications for policy, training, and organizational design.

Methods

This study was conducted as a focused narrative review. A narrative approach was selected because the literature on rural health care leadership is methodologically heterogeneous, spanning qualitative studies, surveys, mixed-methods research, and policy analyses across diverse international settings, which limits formal quantitative synthesis. The objective was to integrate recurring themes and practical implications rather than estimate pooled effect sizes.

Sources were identified through searches of PubMed, Scopus, and Google Scholar, supplemented by hand-searching reference lists of relevant articles. Search terms included combinations of rural, remote, health care leadership, physician leadership, nurse leadership, management, burnout, and community participation. Priority was given to peer-reviewed empirical studies with clear relevance to rural health care settings. Authoritative institutional reports were included selectively to contextualize workforce maldistribution and rural health inequities. We considered English-language sources indexed up to January 2026. Priority was given to peer-reviewed empirical studies published from 2000 onward to reflect contemporary rural health systems and leadership practice; however, earlier seminal publications were included selectively where conceptually important.

Challenges and leadership styles

Empirical studies repeatedly show that rural leaders operate with wide role



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spans, thin managerial scaffolding, and persistent resource constraints that shape both what they do and how their styles are perceived.^{8,9} In northern Norway, municipal lead physicians described a “wide leadership span” that merged clinical service oversight with public health responsibilities, under conditions of human-resource scarcity and time pressure; leaders aspired to coaching/coordination but defaulted to a less effective “management by exception” (lower the level of formalized leadership and opt more for problem-solving) when workload spiked.⁸ In the same national context, clinic staff subsequently rated rural physician leaders as predominantly change-oriented, valuing adaptability and improvement, while also signaling that relational and task routines must not be neglected in small, interdependent teams.¹⁵

Evidence from Malawi’s rural primary care centres similarly identified a composite “transformational” style (vision + relation + task + change) contrasted with a “control” style focused on administrative compliance; nearly half of those in charge of centres reported no formal management training, indicating that leadership repertoires are often assembled informally from lived practice.¹⁶ Across these settings, a common pattern emerges: the rural context pushes leaders toward adaptation and improvisation, but sustained performance depends on balancing change orientation with reliable task systems and intentional relational work.^{8,15,16}

Rural nursing leadership shows parallel pressures. Nurse managers in Australian rural services describe “expanded,” multifunctional roles (“jack-of-all-trades”) that regularly blend clinical duties with administration and staff coordination.¹⁰ Quantitative work on structural empowerment among rural nurse leaders in Victoria, Australia, found empowerment at a moderate level and highlighted that access to information, resources, and support correlated with stronger leadership climate and safer care culture.²⁰

In primary care physician leadership, Norwegian general practitioners reported tension between clinical work and leadership responsibilities, citing limited training and structural barriers, evidence that the clinician-to-leader transition is not scaffolded in rural systems.⁸

These findings align with conceptual expectations from leadership theory. Rural leaders often enact a situational mix: transformational behaviours to mobilize change, transactional behaviours to assure compliance and throughput, and distributed/relational behaviours to maintain cohesion in



small teams.^{15,16} Yet the absence of dedicated managerial infrastructure means the “system” frequently lives in the leader’s head and calendar, increasing variance in practice and exposure to burnout.^{8,19}

Structural misdistribution of clinicians compounds these style pressures. In Canada, a persistent gap remains between the rural population share (~18–19%) and the physician share (~8%), placing disproportionate leadership and coordination burdens on rural teams.⁵ In such conditions, “doing leadership” often means making repeated trade-offs, what service to sustain, which outreach to pause, which staff to cross-train, under information asymmetry and minimal slack.^{8,20}

The literature’s practical message is blunt: change-orientation is necessary in rural organizations, but insufficient unless leaders deliberately institutionalize task discipline (e.g., huddles, checklists, escalation criteria) and relational routines (e.g., structured debriefs, feedback norms) that prevent a permanent drift into ad hoc problem-solving.¹⁵⁻¹⁷

Crisis leadership

Public-health emergencies expose weaknesses in leadership routines. During COVID-19, leaders of small rural nursing homes and home-care services in western Norway described continual role renegotiation, policy churn, and precarious supply lines.¹⁷ Three cross-cutting themes characterized effective practice:

- Sense-making and communication: leaders reduced ambiguity for staff and families despite evolving guidance
- Flexible governance and resource improvisation: leaders adjusted rosters, repurposed spaces, and created ad hoc decision cadences
- Protection of staff well-being: leaders buffered psychological load and maintained team cohesion

These findings crystallize a form of resilient leadership: individual resilience supported by adaptive micro-structures that enable continuity in unstable conditions.¹⁷

Australian data from two rural health services reinforce and broaden this pattern. Through in-depth interviews with executives and clinical leaders, Watkins and colleagues¹⁸ identified six themes of pandemic leadership:

1. A unifying mission (“working toward a common goal”)
2. Delivery redesign to maintain care under constraints
3. Rapid upskilling and information flow



Public-health emergencies expose weaknesses in leadership routines. During COVID-19, leaders of small rural nursing homes and home-care services in western Norway described continual role renegotiation, policy churn, and precarious supply lines.¹⁷

4. Governance adaptation, clear decision rights, and incident command suited to local realities
5. Attention to psychological impacts, support for leaders and frontline staff
6. Community engagement, leveraging trust and local networks for behaviours critical to public health

The authors argue that rural preparedness requires codified emergency plans, exercised in advance, that reflect geographic dispersion, limited redundancy, and interdependence with local governments and civil society.¹⁸

A qualitative article²¹ for physicians on lessons learned during the COVID-19 pandemic in the Canadian rural setting showed that the four main factors that supported physician leadership in terms of rural resilience were:

1. Continuity of care (having a consistent physician who is familiar with the community)
2. Team-based care models (working in a team toward a common goal)
3. Physician well-being (the COVID-19 pandemic took a toll on physicians)
4. Openness to innovative care models (such as virtual care and new communication procedures to care for the most vulnerable patients)

Importantly, the three studies above^{17,18,21} highlight the double-edged nature of smallness in crises. Rural services are fragile because they lack redundancy; single points of failure (e.g., one respiratory therapist, one pharmacist) are common. Yet smallness also enables speed and cohesion in emergencies: short decision chains, strong social ties, innovative practices and visible leadership presence.^{17,18,21,22} Leaders who framed uncertainty transparently, flattened communication barriers, and translated policy to practice rapidly were more likely to sustain services and trust.^{17,18} The implication for non-crisis operations is straightforward: embed crisis-tested routines into everyday governance — hold brief sense-making huddles, set explicit escalation thresholds, conduct after-action reviews — to convert agility from an emergency reflex into an organizational habit.¹⁶⁻¹⁸

Beyond the pandemic, these crisis capabilities generalize to wildfires, floods, and prolonged workforce shocks. Strategic foresight work suggests that rural leaders will increasingly face compound events, disease outbreaks coinciding with heat waves, supply-chain disruptions, or digital infrastructure failures, where success depends on anticipatory planning and distributed leadership practised before the sirens start.²⁰ In short, crisis leadership in rural health is not a separate skillset; it is an amplification of

everyday rural leadership done with greater tempo, clarity, and protection of people.^{17,18}

Leadership development

Rural health care systems repeatedly report that formal leadership preparation is scarce, with most leaders learning on the job under conditions of high role complexity.^{8,9,22} This has motivated a series of interventions designed to build context-sensitive leadership capacity. In Arctic Norway, Hartviksen and colleagues¹⁴ used participatory action research to co-create a continuous leadership development program with 23 municipal health care leaders across levels. Two key shifts were identified, moving from “striving solo players” to “team players” and learning to navigate conflicting and complex contexts. The program was deliberately collective and relational rather than a skills course, and it embedded competence development, structured interaction, interpersonal safety, and shared values as core elements. The emphasis on interaction and trusted reflection highlights that in small, interdependent teams, leadership growth is best achieved collectively.

Parallel insights come from nursing. Bish and colleagues²⁰ found that rural nurse managers’ sense of structural empowerment, defined as access to information, resources, support, and opportunity, was moderate, but strongly correlated with improved safety climate and organizational responsiveness. In practice, this means leadership development in rural settings cannot be divorced from system design: leaders need actual levers and resources, not just training, to exercise influence. Elsewhere, nurse leadership initiatives stressed coaching, relational competence, and role modeling, recognizing that in rural hospitals and clinics, nurses often act as the de facto coordinators of interprofessional teams.

In low- and middle-income countries, where leadership training is often absent, nearly half of rural primary care managers reported no management preparation; leadership style correlated more with personal experience and improvisation than with training.¹⁶ This reinforces the need to provide structured training early in careers, ideally integrated into clinical education pathways, so that future rural leaders do not face leadership responsibilities unprepared.⁹ The converging message is clear: rural leadership development must be continuous, co-created with local stakeholders, and supported by system-level empowerment. Short-term courses may raise awareness, but they are not enough. Sustained practice change requires structural reinforcement and collective processes.



In practice, this means leadership development in rural settings cannot be divorced from system design: **leaders need actual levers and resources, not just training, to exercise influence.**

Workforce and leader well-being

In rural health care, leadership is carried out under conditions of systemic workforce scarcity. This makes leader well-being a strategic issue: If rural leaders burn out or leave, the capacity gap widens.^{1,6} Recent data from a survey of 288 rural health care leaders across the United States revealed that, although 81% reported being satisfied in their job, 40% met burnout thresholds and nearly half (49.8%) intended to leave their leadership position within two years.¹⁹ The authors show that greater work control and organizational trust reduced burnout and turnover intentions, while higher stress strongly increased them. Leaders who perceived alignment between personal and organizational values also reported higher satisfaction.¹⁹ Qualitative responses emphasized daily operational pressures, interpersonal conflicts, and systemic industry challenges.

These findings converge with qualitative evidence from Norway and Australia during COVID-19, where leaders described being stretched across competing demands, struggling with personal stress, yet feeling bound by responsibility to sustain care.^{17,18} They illustrate that even when satisfaction is high, leaders may still burn out under chronic overload. Protecting leader well-being, therefore, requires structural interventions: redistributing responsibilities, increasing decision latitude, providing peer support, and ensuring access to psychological safety and reflective spaces.¹⁹

Looking ahead, Reimers-Hild²³ argues that rural health care leaders will need to adopt strategic foresight to anticipate disruptive workforce shifts: exponential technologies, demographic transitions, and evolving consumer expectations. The combination of chronic shortages and emerging disruptions means that workforce strategy cannot be reactive. Leaders must cultivate innovation, stakeholder engagement, and scenario planning as routine competencies. The evidence suggests that without protecting and equipping leaders, the rural workforce crisis deepens; with empowered and supported leaders, rural systems can build resilience.

Community participation

The participation of citizens and local organizations is widely promoted as a lever to align services with local needs in rural systems, but the empirical record shows that genuine



power-sharing remains uncommon. In an international scoping review, Kenny and colleagues¹² identified only a small number of cases that reached high-level “citizen power,” noting that, although strong partnerships and social ties were consistently cited as success factors, most reports lacked detail on representation, authority, and outcome measurement. A more recent synthesis of rural health leadership literature¹³ emphasized adaptive leadership and health promotion approaches that embed communities in decision-making and highlighted the value of international collaboration for knowledge exchange.

Together, these reviews^{12,13} reinforce the belief that participation must be structured. It is important to clarify who sits at the table, what decisions are delegated, how conflicts are resolved, and how results are measured; otherwise, participation may remain consultative rather than co-governed. In small rural settings, where leaders and community members share social networks, trust and transparency are especially salient: clear communication about constraints and trade-offs builds legitimacy even when resources are scarce. The leadership implication is that rural managers should institutionalize community authority (e.g., community health boards with defined decision rights and evaluation plans) rather than rely on ad hoc engagement.

Competencies and traits

Across heterogeneous contexts, studies converge on a competency profile that differentiates effective rural leaders. Qualitative work from Australian rural and remote services highlights adaptability, conscientiousness, role modeling, staff and community involvement, and resilience, with “rural-specific” emphases, such as generational awareness and deep community attachment.²⁴ As mentioned above, staff in Norwegian rural clinics most often perceive physician leaders as change-oriented, valuing direction setting and improvement behaviours under constraint, but they simultaneously expect relational and task discipline to sustain cohesion and reliability in small teams.¹⁵ Physician leaders consistently report role conflict and limited formal preparation, underscoring the need to scaffold transitions from clinician to leader with training in governance, finance, human resources, and community partnership.^{8,9} Synthesizing these findings with crisis evidence, the practical rural leadership profile includes adaptability, emotional intelligence (for difficult conversations in close-knit teams), cultural humility (especially in Indigenous and minority communities), clinical courage (decisive action under uncertainty), and change orientation anchored by task and relational routines.

Limitations

This review has several limitations that should be acknowledged. First, it is a focused narrative rather than a systematic review; although sources were selected deliberately and grounded in peer-reviewed empirical work, the synthesis is susceptible to selection bias and does not provide quantitative estimates of effect sizes or causal relationships. Second, the evidence base on rural health care leadership remains uneven: much of the literature relies on qualitative studies, small samples, self-reported perceptions, and cross-sectional designs, which limits generalizability and precludes strong causal inference. Third, the review draws predominantly on studies from Scandinavia, Australia, North America, and selected low- and middle-income settings; findings may not fully translate to rural systems operating under different political, cultural or financing arrangements. Fourth, leadership concepts and measures vary widely across studies, making direct comparison difficult and increasing conceptual heterogeneity. Finally, publication bias is likely, with successful programs and positive leadership practices more frequently reported than failed or neutral initiatives. These limitations underscore the need for more longitudinal, mixed-method, and comparative research to test mechanisms, outcomes, and transferability of rural leadership interventions across contexts.

Summary and conclusion

The rural leadership evidence base is smaller than the urban hospital literature but remarkably consistent across countries and methods. First, role stacking is the norm: rural leaders often combine clinical, administrative, and governance work; without structural support, this drives reliance on ad hoc problem-solving that erodes planning. Second, staff perceive effective leaders as change-oriented, but sustained performance depends on balancing change with relational and task routines. Third, crisis research shows that rural services are fragile yet agile: leaders who communicate transparently, adapt governance quickly, protect staff, and engage communities preserve continuity despite scarcity. Fourth, development and empowerment matter: co-created, work-embedded leadership programs and structural empowerment for nurse leaders strengthen capability and safety culture. Fifth, leader well-being is a system variable: high burnout and intent-to-leave among rural leaders threaten stability and are mitigated by decision latitude, organizational trust, and alignment of values. Finally, community participation must move

from rhetoric to real authority, defined membership, decision rights, and outcome evaluation, if rural governance is to be locally responsive.

Policy and practice implications are direct. Health systems should:

- Fund longitudinal, cohort-based leadership development for rural clinicians transitioning to leadership
- Codify structural empowerment levers (information, resources, decision rights) for nurse and physician leaders
- Institutionalize crisis routines into everyday governance
- Formalize community authority with measurement
- Protect leader well-being via workload design, decision latitude, and peer support

Rural leadership is not a soft add-on; it is the mechanism by which scarce resources are converted into access, trust, safety, and continuity. Investing in rural leadership capability is, therefore, a first-order strategy for health equity and system resilience.

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Mean statistics can be nice: Using normal techniques when data are not normal



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In this ninth article in the health economics series, we explore when simple methods assuming normal distributions can be used to analyze skewed data, such as costs or outcomes. Skewness occurs because many people described by the data have low (or high) values but there are also some extreme observations, resulting in a data distribution that is neither “normal” nor symmetrical. In such circumstances, some may worry about whether the simple average (the mean) may be biased and if simple tests of it (e.g., the t test) may not apply. We provide examples illustrating these scenarios and explain how the sample mean is unbiased regardless of how the data look. In addition, we explore how the central limit theorem ensures that the simple t test is an acceptable choice in many scenarios.

KEY WORDS: leadership, simple statistics, health economics

Hoch JS, Dewa CS. Mean statistics can be nice: using normal techniques when data are not normal. *Can J Physician Leadersh* 12(3): 150-157. <https://doi.org/10.37964/cr24813>.

Evidence informing health care leaders' decisions may come from data that do not show a “normal” (i.e., bell-shaped) distribution. For example, you might need the average cost from a skewed cost-distribution or the expected value from a satisfaction survey where most answers gravitate to the upper (or lower) part of the response range. You might recall the sacrosanctity of the normal distribution from classes, with the sample mean and simple tests (e.g., a t test) helping to inform strategic leadership decisions. But, they can only do that if the data are normally distributed, right? This article discusses why and when skewness is not an impediment to using the sample mean and analyzing it with common statistical tests.

When data have different shapes

The shape of your data's distribution reflects its key characteristics. For example, cost data have a lower limit of \$0 and usually a long tail to the right because of some high-cost patients. Treating a few long-stay or high-expense patients produces the familiar "small-proportion-of-patients-drive-most-cost" pattern often observed in health care data. When Le and colleagues¹ studied the cost of dizziness, they identified over 12,000 cases in a Canadian tertiary care hospital's data between January 2009 and December 2014. The authors noted that the cost data were highly skewed in spite of the large sample. Enlarging the sample does not eliminate skewness, as the existence of a small group of extremely costly individuals does not diminish with increased sample size. The authors used the mean costs in their data to estimate the cost of dizziness across all of Ontario by multiplying the mean cost by the relevant number of people. Given that the data were skewed, is the estimate of the mean biased?

Data can be skewed in the other direction because of "ceiling" effects. Ceiling effects occur when there is a fixed upper limit (e.g., 100 on a scale from 0 to 100) and most people are at or near that upper limit. A familiar example is patient satisfaction ratings. For patient satisfaction, the EQS-H scale (Échelle de Qualité des Soins en Hospitalisation) has been used to assess inpatient satisfaction with medical information and relationships with staff,^{2,3} and, although the EQS-H is convenient to use for both hospitals and patients, its psychometric properties are compromised by, among other things, ceiling effects.⁴ If most patients who complete satisfaction studies are generally highly satisfied (or unsatisfied), a large clumping of scores will occur at the top (or bottom) of the scale. Does the skewness of these data prevent their use to explore areas for quality improvement? For example, could a simple *t* test be used on the skewed data to determine whether a quality improvement initiative is associated with a significant improvement in scores?

What about data that are U-shaped, with peaks at both low and high ends of the distribution? This pattern has been observed in physician satisfaction and burnout studies. A study published in the *Mayo Clinic Proceedings* reported that professional challenges for physicians vary by career stage, with mid-career appearing to be a particularly challenging time.⁵ The authors suggested that their findings about mid-career challenges are, "consistent with the Community Tracking Study of physicians conducted in the 1990s⁶ and with studies conducted in other fields."⁷ If you believe the authors' claim that, "the nadir in satisfaction during middle career is not a new phenomenon, [and it is] unlikely that the findings... are due to generational effects alone," then your organization's survey of physician satisfaction may produce data that are

U-shaped. Will you be able to test if your organization is different from the national average using a *t* test?

Q: Is the sample mean biased? A: No.

Figure 1 shows the data distributions of the three variables described above: cost, physician satisfaction, and patient satisfaction. Each shape differs from the standard normal distribution. Nevertheless, the sample average is not a biased estimate of the mean. To the contrary, the sample average is the best linear unbiased estimate.⁸ In the appendix, we explain this in more detail. The main point is that, according to theory, the sample mean is unbiased for all distributions, including skewed data.

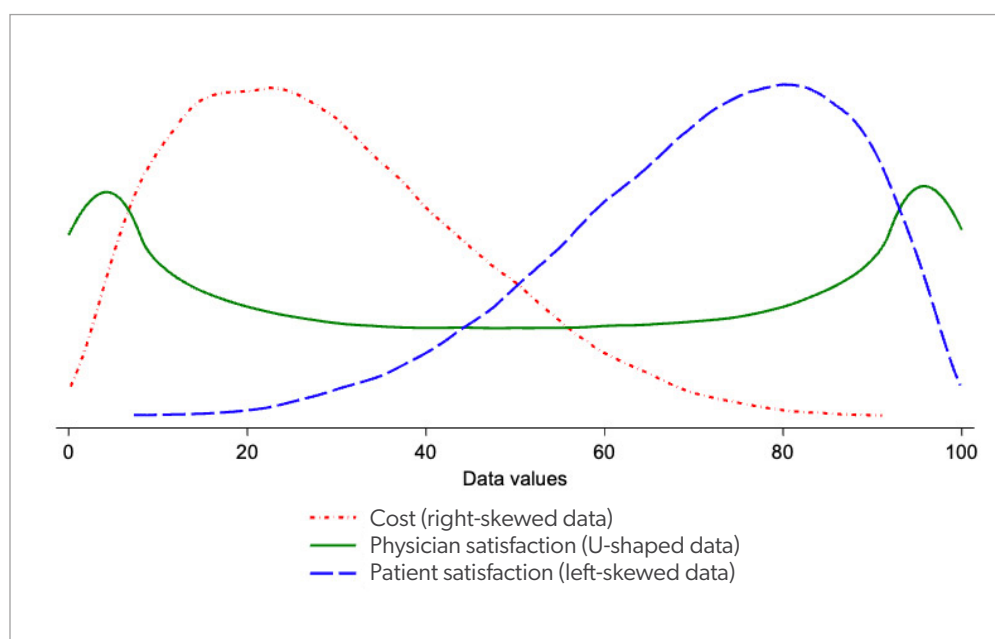


Figure 1: Example of data distributions for cost, physician satisfaction, and patient satisfaction illustrating a variety of non-normal shapes.

Empirically, we can double-check this by taking lots of samples from the data distributions in Figure 1 and calculating the mean of each sample. Figure 2 shows what happens if we make a graph of all the means we calculate from all the samples we take. There are two essential observations.

First, the dotted vertical lines in Figure 2 are the mean values from the distributions in Figure 1. One can see that the distributions of the means of each sample collect around the same expected value as the data (the peaks in Figure 2 are at the mean values of Figure 1's distributions, shown with vertical lines in Figure 2). This is empirical proof that, regardless of the shape of the data's distribution, the mean's distribution will centre on the data's expected value. This illustrates the claim that the mean is unbiased.

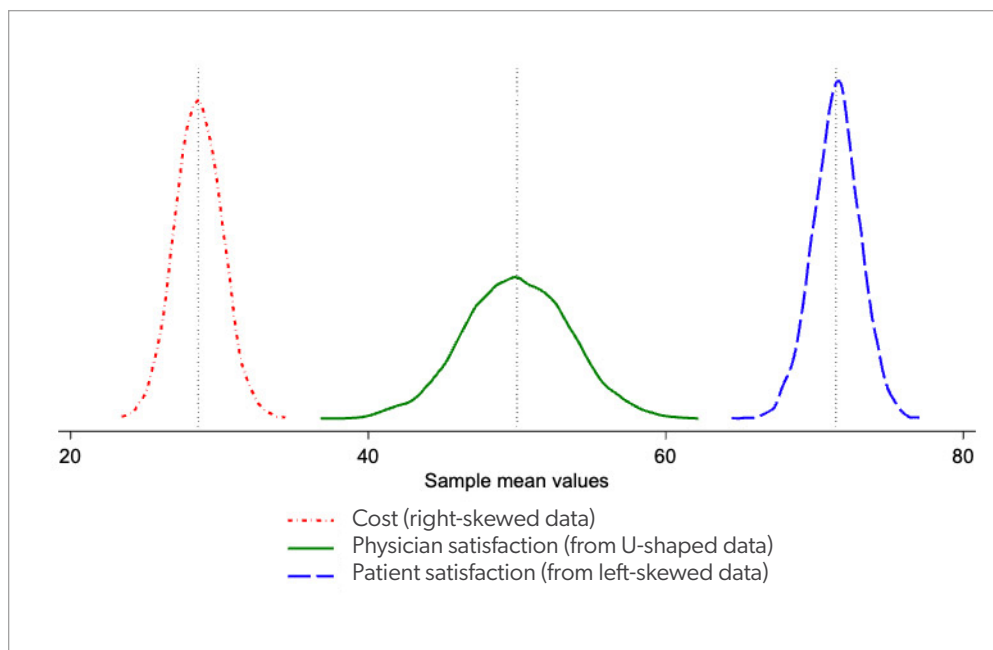


Figure 2: Normal distributions of the mean for cost, physician satisfaction, and patient satisfaction centred at the true mean.

Q: Are statistical tests that assume normality wrong? A: Not really.

The second observation from Figure 2 involves the shapes of the distributions of the means. Each distribution in Figure 2 is bell-shaped (they all have the shape expected of a normal distribution). The left-most normal distribution in Figure 2 (cost) is a collection of means fashioned together from repeated samples of the right-skewed data shown on the left in Figure 1. Likewise, the right-most normal distribution in Figure 2 (patient satisfaction) is a collection of means fashioned together from repeated samples of the left-skewed data on the right in Figure 1. Regardless of the shape of the data, the distribution of the means is bell-shaped. This finding is not surprising; it is formally described by the Central Limit Theorem, which some have called the “most fundamental theory in modern statistics.”⁹ However, it is important to note that, when applying the theorem, the bigger the skewness in your data, the bigger your sample needs to be to assume the mean is normally distributed.

In our example, Figure 2 is made from lots of samples from people ($n = 100$). With this relatively small sample size, the mean is able to overcome the non-normality of the data distributions in Figure 1. For statistical testing, if you are willing to assume the sample mean for your data is normally distributed, then you can use the t test for 95% confidence intervals and statistical tests. With data that are not very skewed, $n > 30$ is a rule of thumb where assumptions about the data distribution no longer matter, since the sampling distribution for the mean is considered normal, according to the

Central Limit Theorem.⁹ This means that in many circumstances, statistical tests that assume normality (e.g., the *t* test for means) are not incorrect, even if the data are skewed. The appendix has more about the Central Limit Theorem.

Worst case scenario (large skew, small sample size)

With some data (e.g., cost or charges), often there is no theoretical upper bound and this can lead to data distributions with tremendous skewness and major deviations from normality. A small sample size leads to legitimate concern that the Central Limit Theorem may not hold. What should one do then? In the article, “Help, my data are skewed,” Dr Alice Sitch recommends either transforming the data or conducting non-parametric tests (not assuming normality).¹⁰

But these alternatives are not without problems of their own. For example, while a transformation may create data that are normally distributed on the transformed scale, the inferences will be about the data on the transformed scale. This can make the interpretation of statistical tests difficult. A common transformation for skewed cost data is the log transformation, e.g., transformed cost = $\log(\text{cost})$. A *t* test of log costs will provide information about whether log costs differ; leaders may care more about actual costs. Retransformation back from log cost to actual cost is not straightforward. Moreover, there is no guarantee that the logarithm of cost is the right transformation to make. In their study of costs, Briggs and colleagues¹¹ found that the estimator involving log cost “can perform appallingly” when the true distribution is not logarithmic. This led them to conclude that, “the sample mean generally remains the estimator of choice, especially when limited sample size prohibits detailed modeling of the cost data distribution.”

Alternatively, parametric tests (tests that do not assume normality) are always an option. However, with a small sample size there is a concern about statistical power (can one detect a difference when there really is a difference). Dr. Sitch warns, “Often, transformation of data is preferred to using non-parametric alternatives because parametric tests tend to be more powerful, allow adjustment for confounders (using regression), and provide an estimate of the difference between groups with a confidence interval. However, interpretation of analyses using transformed data may not be as intuitive as when data is analyzed in the original form.”¹⁰ As a compromise, one can use multiple testing strategies. For example, in a study of relationship management therapy for patients with borderline personality disorder in Ontario, researchers analyzed skewed data for 27 patients using both the *t* test and non-parametric methods, and they found significant

reductions in restraint, constant nursing observation, self-harm incidents, and in-patient days.¹²

Conclusion

When you see data that are not normally distributed, you can be confident that the sample mean is not biased. The Central Limit Theorem states that regardless of the shape of the data, the mean's distribution will be normal. This ensures that if you want to test whether two groups (e.g., intervention vs. control) or two time periods (e.g., before vs. after) are different, simple methods, such as a *t* test, will likely be acceptable. With a small sample, transformations or non-parametric testing methods may be useful alternatives; however, a larger sample size might be needed to know which transformation to use or to have enough power to conduct a meaningful non-parametric test. But, with larger sample size, the Central Limit Theorem kicks in and justifies the use of simple methods using the untransformed data and a *t* test. These considerations influence the analysis of cost-effectiveness data, which often involves relatively simple methods to estimate a difference in means and statistically test the cost-effectiveness of new treatments and interventions.¹³

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Appendix

The sample mean is an unbiased estimator of population mean

If the data come from any distribution with an expected value equal to μ , (formally, $E[x] = \mu$), then adding up the data and dividing by the sample size n has a mathematical expectation written as $E(\sum x/n)$. Getting rid of the summation $\sum$ symbol, we have

$$\begin{aligned} E(\sum x/n) &= E[(x_1 + x_2 + \dots + x_n)/n] = (1/n) E[(x_1 + x_2 + \dots + x_n)] = \\ &= E[x_1]/n + E[x_2]/n + \dots + E[x_n]/n = \\ &= \underbrace{\frac{\mu}{n} + \frac{\mu}{n} + \dots + \frac{\mu}{n}}_{n \text{ terms}} \\ &= n \mu/n = \mu \end{aligned}$$

The intricacies of how the mathematical expectation E migrates through the terms are ignored here, but the absence of an assumption about normality (or any distribution for that matter) is crucial. The statistical definition of unbiased is that the expected value of the estimator equals the true value of the population parameter being estimated. In this case, the expected value of the simple mean, the $E(\sum x/n)$ term, equals the population value μ , regardless of what μ is or how the data are distributed. This means, according to theory, the sample mean is unbiased for skewed data. A visual explanation is available online.¹⁴

The shape of your sample data's distribution does not affect the shape of your sample mean's distribution

If you calculate a sample mean of \$1,000,000, then how could this vary, why would the variation have a shape, and how would we know the shape in advance? The secret is that your sample mean varies when your sample varies. So, yes, your current sample has a mean of \$1,000,000 but you recognize with a different sample you would get different data and a different mean.

Is there anything we can say about all these means we keep calculating from all of the samples we imagine we are taking? Yes, there are two things that researchers have learned. The central location of the mean's distribution will be at the true mean, and the shape of the mean's distribution will be "normal." This second observation, about the mean's distribution being bell-shaped regardless of the shape of the data's distribution, is the Central Limit Theorem. A visual explanation is available online.¹⁵

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Beyond the algorithm: health informatics and the future of health care AI



Jonas Bambi, MBA, PhD

Elizabeth Borycki, RN, PhD

Andre Kushniruk, PhD

Emma Nsalazi Bambi, MD, MMed

Artificial intelligence (AI) is increasingly presented as a transformative force in health care. Yet many questions now confronting health care organizations, including how to integrate computational recommendations into clinical practice, establish clinician trust, evaluate impact, ensure safety, and sustain adoption, are not new. Clinical decision support systems (CDSS) and earlier generations of health care AI have confronted many of these challenges for decades. This viewpoint argues that the future of health care AI should build on, rather than bypass, the accumulated knowledge of health informatics. Established theories and methods from health informatics, human factors, implementation science, public health, and health systems research provide foundations for designing, evaluating, implementing, and continuously improving AI-enabled interventions. Health informatics professionals can play a pivotal role by connecting clinical problems, information requirements, technology, implementation, evaluation, and organizational learning. Equally important, physicians and other clinicians must be partners throughout the AI lifecycle rather than downstream recipients of technologies developed elsewhere. Bringing these elements together provides a pathway from isolated AI applications toward a learning health system in which data generated through care continuously contribute to knowledge, improvement, and better care.

KEY WORDS: artificial intelligence, health informatics, clinical decision support systems, learning health system, sociotechnical systems

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Artificial intelligence (AI) has generated extraordinary expectations in health care. Machine learning can identify patterns within enormous datasets, predict clinical outcomes, process unstructured information, and increasingly generate clinically meaningful content. With these capabilities has come an understandable question: how fundamentally will AI transform health care?

There may, however, be another question that deserves equal attention: what have we already learned about introducing computational intelligence into clinical care, and how can that now be leveraged for implementing AI?

Long before contemporary AI, health informatics researchers and practitioners developed clinical decision support systems (CDSS) intended to place relevant knowledge and patient-specific information in front of clinicians at appropriate points in decision-making. From early expert systems to alerts, reminders, order sets, diagnostic aids, and predictive models, the underlying aspiration has remained remarkably consistent: use information to support better decisions and, ultimately, better outcomes.^{1,2}

Many challenges now associated with AI also have precedents in earlier generations of health information technology: human factors, usability, integration into clinical work, safety, trust, and adoption.^{3,4} The technology has changed dramatically. Many of the implementation challenges have not.

Therefore, the future of health care AI should not be approached as though health care is encountering intelligent decision support for the first time. We should build on decades of health informatics knowledge while incorporating established theories and methods from human factors, implementation science, public health, health systems research, and related disciplines. Doing so highlights an increasingly important role for health informatics professionals and for physician leaders willing to partner with them.

From clinical decision support to AI-enabled decision support

Early CDSSs were largely knowledge-based. Clinical expertise could be represented through rules and logical relations to generate recommendations, diagnostic suggestions, alerts, or reminders. Systems, such as MYCIN, demonstrated decades ago that computers could represent sophisticated clinical knowledge and support reasoning.¹

As electronic health records became widespread, decision support increasingly became embedded within clinical information systems through medication alerts, reminders, order sets, and guideline-based recommendations. At the same time, researchers noted that the quality of the decision rule was only one determinant of success.

A clinically valid alert presented at the wrong point in workflow could become noise. Too many warnings, alerts, and reminders contribute to alert fatigue. Useful information presented without appropriate clinical context may fail to influence clinical decisions or lead to outright rejection of the tool (e.g., ignoring the information provided). Consequently, health informatics researchers identified that CDSS interventions need to be considered within a physician's sociotechnical work context rather than simply as technological tools that may improve the quality of physician decision-making without accounting for the patient context in which they are applied.⁵

Contemporary AI greatly expands what is computationally possible. Machine learning can derive complex patterns from data, natural language processing can extract information from clinical narratives, and generative AI can synthesize information and interact with clinicians and patients in increasingly natural ways. Yet greater computational sophistication does not eliminate earlier lessons arising from the evidence-based literature. It makes them more important.

The question is no longer simply, "Can the algorithm predict?" We must also ask: Should this prediction be made? For whom? Using what information? At what point in the care process? How should it be communicated? Who acts on it? How will its consequences be evaluated? AI changes what decision support can do; it does not eliminate what health informatics research has contributed to the clinical decision support literature.



Health informatics as the bridge

Health informatics occupies a distinctive position at the intersection of clinical practice, information science, technology, data, and organizational change. Health informatics professionals can help translate a clinical concern into an information problem and determine whether technology, and specifically AI, is an appropriate intervention. When AI is appropriately implemented, teams of clinicians, data scientists, developers, organizational leaders, quality-improvement teams, privacy specialists, patients, and other stakeholders can work together to solve complex problems.

Such teamwork is critical at the inception of AI projects. Teamwork should not begin after an algorithm has already been developed, but as real-world clinical problems are identified. Health informatics should contribute throughout the lifecycle: defining the clinical problem and information requirements; understanding workflows; assessing available data; contributing to design and validation; planning implementation; evaluating intended and unintended consequences; and supporting continuous improvement.

In this sense, health informatics professionals serve as innovators, translators, integrators, evaluators, and facilitators of system learning in health care organizations. These roles are particularly important in addressing the human-factor challenges associated with health care AI. Kushniruk and Borycki,³ for example, highlight the importance of usability, user experience, clinical workflow, information needs, and human–computer interaction in the design and implementation of AI-enabled systems. These considerations are not peripheral to AI development; they are central to determining whether an AI intervention can be effectively integrated into clinical practice.

For physician leaders, this partnership is particularly important. When working on AI projects, physicians bring to the forefront their knowledge of clinical reasoning, professional responsibilities, patient relationships, clinical context, and the consequences of decisions. Informatics professionals bring complementary expertise concerning information, technology, workflow, interoperability, human-computer interaction, implementation, and evaluation. Neither perspective is sufficient alone, but creating interdisciplinary teams can lead to real-world solutions to difficult clinical problems.

We do not need a new theory for every AI problem

The excitement surrounding AI can create a tendency to treat its design and implementation challenges as unprecedented. Many are not.

Health care and health informatics already include theories, frameworks, and methods for understanding why technologies succeed or fail. Sociotechnical approaches emphasize interactions among technologies, people, workflow, organizational structures, and policies.⁵ Human-factor approaches examine cognitive workload, usability, information presentation, clinical reasoning, and human-technology interaction.³ Implementation frameworks, such as Consolidated Framework for Implementation Research (CFIR), help examine interventions, implementation settings, individuals, and processes,⁶ while Non-adoption, Abandonment, Scale-up, Spread, and Sustainability (NASSS) draws our attention to challenges surrounding adoption, scale-up, spread, and sustainability.⁷

Public health and health systems perspectives add another important dimension. Health care data reflect not only disease but also access to services, clinical decisions, documentation practices, organizational structures, social circumstances, and existing inequities. AI systems trained on these data may, therefore, learn patterns shaped by the health care system and its context, rather than by the underlying clinical phenomenon alone.

These perspectives serve complementary purposes. Human factors and sociotechnical approaches can inform what and how we design. Implementation science can help explain how an intervention becomes embedded and sustained in practice. Public health and health systems perspectives can help us understand the context producing both the clinical problem and the data from which AI learns.

Taken together, these theories and frameworks help us move from asking, “What can we predict from the data we have?” toward, “What information and knowledge do we need to improve this decision?”

Evaluation must extend beyond algorithmic performance

Accuracy, sensitivity, specificity, discrimination, and calibration are necessary for evaluating many AI models. However, they are not sufficient for determining whether an AI intervention should become part of health care.



Public health and health systems perspectives add another important dimension.

Health care data reflect not only disease but also access to services, clinical decisions, documentation practices, organizational structures, social circumstances, and existing inequities.

Consider a model with excellent discrimination. If its recommendation arrives after the clinical decision has been made, is it effective? Is it safe to apply? Can clinicians override it when appropriate, and if they systematically do so, why? If it increases workload, does its benefit justify that burden? If performance differs across populations, what are the equity implications, and how should those differences be addressed?

Thus, health care AI requires evaluation across technical performance, clinical effectiveness, usability and workflow, implementation, safety, equity, organizational impact, sustainability, and unintended consequences.

Health informatics already provide methods that can support this broader evaluation. Kushniruk and Borycki,³ for example, describe a staged user-centred approach progressing from laboratory usability testing to clinical simulation and, subsequently, to “near-live” testing under increasingly realistic conditions. This recognizes that successful AI implementation depends not simply on what an algorithm calculates, but on what happens when clinicians interact with it under real clinical conditions.

To understand how these human-factors considerations can affect implementation, consider an AI-enabled clinical decision support tool designed to identify patients at risk of clinical deterioration. The model may accurately identify a high-risk patient, but its clinical value depends on how that prediction is integrated into practice. If the alert is presented after the clinician has already assessed the patient, interrupts the clinician repeatedly, provides insufficient information to understand the basis or significance of the prediction, or does not clearly indicate what action should follow, a technically accurate prediction may provide little clinical benefit. Human-centred evaluation can identify these problems before widespread implementation by examining when and how the alert should appear, how clinicians interpret and respond to it, and how it affects existing workflows.

Safety provides a particularly important illustration of why evaluation must extend beyond algorithmic performance. Borycki and Kushniruk^{4,8,9} draw on the concept of technology-induced error — errors arising through technology design and development, implementation and customization, interactions with work processes, and interfaces among information systems. AI may, therefore, introduce new types and patterns of error



through interactions among technology, clinicians, information, and workflow. Importantly, some may emerge only when AI is introduced into complex real-world health care workflows, reinforcing the need for evaluation beyond controlled development and testing environments.

The point is not that every AI initiative must employ every existing framework. Rather, health care and health informatics already possess a substantial body of theories, frameworks, and methods that can inform the design, implementation, evaluation, and sustained adoption of AI-enabled solutions, while also guiding the selection of approaches appropriate to the problem and context. AI presents new capabilities and challenges, but it does not require us to start from scratch. The opportunity exists to build on what we already know while adapting these approaches to the unique characteristics of AI.

Clinicians must be partners, not end users

Too often, clinicians enter technology development near the end, as “users” expected to adopt a completed solution. By then, fundamental decisions about the problem, data, outcomes, workflow, and interface may already have been made. Clinician partnership should begin much earlier.

Physicians and other clinicians can help determine whether the problem is clinically important, whether AI is appropriate, whether predicted outcomes are meaningful, whether available information represents the clinical situation, and whether a recommendation could realistically influence care. Their participation should continue through design, validation, workflow integration, implementation, evaluation, and refinement.

This does not mean clinicians must become machine-learning engineers. It means clinical expertise must remain inside the AI lifecycle rather than being consulted only at its boundaries.

For physician leaders, this creates an important responsibility: their role in AI is not simply to approve or champion adoption. It is to help shape what is built, why it is built, how it enters clinical practice, and how its consequences are judged.

From AI implementation to a learning health system

Successful implementation and adoption of AI should not be the endpoint. The broader opportunity is to integrate AI into a learning health system that

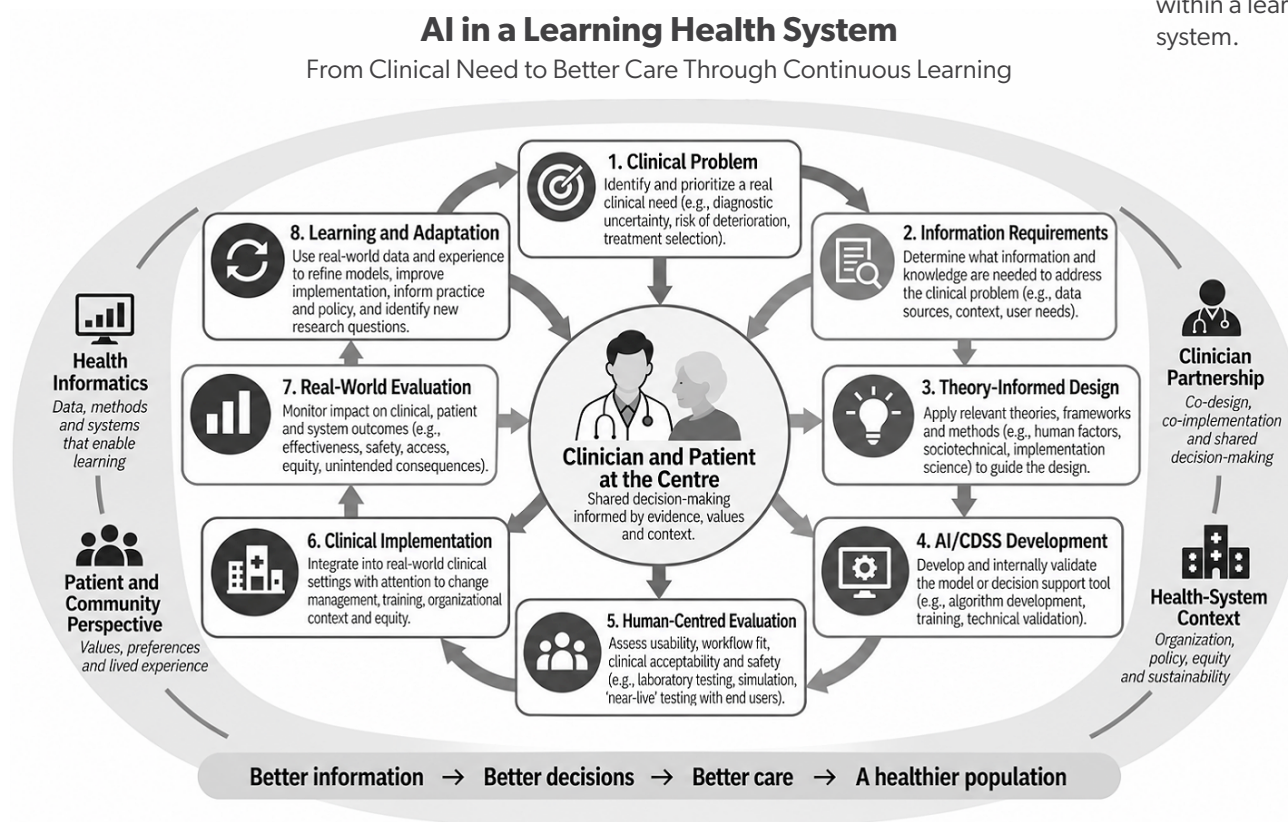


For physician leaders, this creates an important responsibility: their role in AI is not simply to approve or champion adoption. **It is to help shape what is built, why it is built, how it enters clinical practice, and how its consequences are judged.**

continuously uses data generated through care to create knowledge, inform practice, evaluate outcomes, and generate further learning.^{10,11} AI could accelerate this cycle, but deploying predictive models throughout an organization does not by itself create a learning health system.

The critical ingredient is the learning loop. We propose viewing AI-enabled clinical decision support as a lifecycle: Clinical problem → Information requirements → Theory-informed design → AI/CDSS development → Human-centred evaluation → Clinical implementation → Real-world evaluation → Learning and adaptation. Health informatics, clinician partnership, and patient and health-system context span the entire lifecycle (Figure 1).

Figure 1: Lifecycle for developing, implementing, and continuously learning from AI and clinical decision support systems within a learning health system.



The process begins with a clearly defined clinical problem (1), followed by identification of the information and knowledge requirements (2). Relevant theories and frameworks then guide the design (3), leading to the development and internal validation of the AI/CDSS solution (4). Human-centred evaluation (5) assesses usability, workflow fit and safety before real-world implementation (6). Once in clinical use, real-world evaluation (7) examines the impact on patients, clinicians, and the health care system. Finally, new data and experience inform learning and adaptation (8), refining the solution and generating new research questions. Health

informatics, clinician partnership, and patient and health-system context span the entire lifecycle, ensuring that AI is developed and used in ways that are clinically relevant, safe, equitable and sustainable.

Crucially, this is not a linear technology-development pipeline. Learning and adaptation feed back to earlier stages. Evaluation may reveal that the original problem was incorrectly formulated, essential information is missing, workflow has changed, or an intervention creates unintended consequences. Those findings should alter the intervention, and sometimes the information system itself.

AI-enabled CDSSs can, therefore, be understood not as finished products moving from development to deployment, but as components of continuously learning sociotechnical systems.

What can machine learning learn from health care data?

Research led by Bambi and colleagues¹²⁻¹⁴ has repeatedly returned to a deceptively simple question: What can machine learning actually learn from health care data?

Health care datasets are representations of interactions between patients and health care systems, not complete representations of patients themselves. A patient's apparent trajectory may reflect disease progression, but also access to care, service availability, referral pathways, organizational boundaries, documentation practices, and social circumstances. Increasing algorithmic sophistication cannot create important information that was never captured.

This observation has informed an emerging program of research on a Target Information Architecture for Dependable Knowledge Construction in Intelligent Systems. One premise is that AI development should begin by identifying the information required to understand and support the health care problem rather than whatever data happen to be available.

This highlights the difference between a data-first question — “What can machine learning learn from the data we have?” — and an information-first question — “What does the health care system need to know to understand and improve this problem, and do our data adequately represent that information?”

The second question requires clinical knowledge, health informatics, theories of the phenomenon being studied, understanding of the health care system, and engagement with those providing and receiving care. It may also reveal that the appropriate response is not simply a better algorithm: the system may need different information, improved interoperability, redesigned electronic health record documentation interfaces, or connections among information currently fragmented across settings.

Information gaps themselves then become opportunities for system learning and improvement. AI becomes part of a larger learning architecture rather than an isolated prediction engine.

A call to action for physician leaders and health informatics professionals

AI presents health care with remarkable new capabilities. Technological novelty, however, should not lead us to abandon what health informatics has already learned. Decades of CDSS research have taught us that decision support succeeds or fails within clinical workflows and sociotechnical systems. Human-factor and safety research show the importance of understanding interactions between clinicians and technology. Implementation science provides methods for understanding adoption and sustainability. Public health and health systems research remind us that health care data emerge within complex environments. The opportunity is to bring these traditions together.

Health informatics professionals can bridge algorithms and health care systems. Physicians and physician leaders can ensure that clinical purpose, professional judgement, patient needs, and system realities remain central. Researchers, data scientists, patients, organizational leaders, and other stakeholders complete the partnership.

The next chapter of health care AI should, therefore, be less about asking whether AI can transform health care and more about determining how health care can responsibly learn with AI. We are not starting from zero. The theories, methods, and lessons developed through decades of health informatics provide much of the foundation required. The future of health care AI will not be determined by algorithms alone. It will be determined by whether we can build health care systems capable of learning with them.

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The compact we **never renegotiated**



John M. Hwang, MD, FRCSC

The relationship between physicians and the institutions they serve has long been understood as a compact: an exchange of expectations and obligations. These compacts are rarely written down but strongly felt. This concept has deep roots in the organizational behaviour literature on psychological contracts and has been applied specifically to medicine by several authors. Empirical work shows that breaches of this contract measurably affect physician satisfaction and well-being. This viewpoint argues that the traditional, largely implicit physician compact was built for conditions that no longer fully hold. Further, the practice of medicine is demanding and, by most accounts, becoming more so, while the practice of physician leadership specifically is becoming increasingly critical to navigating that difficulty. For physician leadership to be sustained, both physicians and the institutions they serve need to regard it as worth the investment it requires. If the investment on both sides is worthwhile then a subsequent question should be what would make physician leadership sustainable, meaningful, and effective? Drawing on the wider compact literature, this piece argues that an explicit compact, built through genuine dialogue rather than declared unilaterally, is a necessary but insufficient step, and that the real work lies in naming, concretely, what sustains physician leadership over time.

KEY WORDS: physician leadership, psychological contract, organizational compact, physician well-being, leadership development



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The relationship between physicians and the institutions they work within has long been described, informally, as a compact: a set of mutual expectations and obligations that shapes behaviour often without ever being fully written down. The concept has a well-established academic lineage. Organizational scholars have studied what is often called the psychological contract for decades, describing it as the implicit beliefs held by both parties to an employment relationship about what each owes the other.¹ Several authors have applied this idea to medicine, and empirical work on doctors themselves has found that breaches of this contract, particularly around training, career development, and organizational support, are measurably associated with lower job satisfaction and well-being.² The compact, in other words, is not merely a useful metaphor. It has real, documented consequences when it is not honoured.

Physicians from earlier generations, myself among them, often inherited a version of this compact without ever negotiating it directly. Loss of personal time and autonomy, submission to regulation, the weight of fiduciary duties intrinsic to the practice of medicine, and the emotional vulnerability of practice were exchanged for public trust and high standing, meaningful and sustainable work, and autonomy over our work environments. For many of us, that trade has felt worth it. But an inherited compact of this kind depends on conditions holding roughly steady across generations, and there is good reason to doubt that they still do.

A compact built for different conditions

The practice of medicine itself has become more demanding, and most available evidence suggests that this trend is continuing rather than leveling off. Administrative burden, workforce pressures, and the sheer complexity of modern health care systems have all intensified in ways that earlier generations of physicians did not face to the same degree. A compact built for a less complicated set of conditions cannot simply be extended to a harder one by assumption. If the terms of the original exchange assumed a certain baseline of manageability in clinical practice and that baseline has shifted, the compact needs to be renegotiated rather than quietly stretched to cover conditions for which it was never designed.



Organizational scholars have studied what is often called the psychological contract for decades, describing it as the implicit beliefs held by both parties to an employment relationship about what each owes the other.¹

At the same time, the practice of physician leadership has become more critical to navigating this complexity, as health systems increasingly require functions that are difficult for anyone but a physician to perform well: mobilizing peers around difficult change, distinguishing a technical fix from a deeper adaptive problem, and carrying clinical judgement into administrative and political rooms where it does not otherwise travel. Yet the health systems that depend on this kind of leadership often seem to be ill-equipped to develop and sustain it reliably. This raises the stakes of the compact considerably. It is no longer enough for physicians and institutions to share an implicit understanding about clinical practice in general. The compact needs to speak directly to physician leadership as its own distinct domain, with its own demands and its own requirements for support.

What would make leadership sustainable?

This leads to the central question this piece is trying to raise. Both physicians and the institutions asking them to lead need to regard physician leadership as worth the investment it requires rather than assume that is still the case. If worth the investment, then what makes the practice of physician leadership sustainable, meaningful, and effective over time? These are three separable questions, worth naming individually rather than folding into a single vague commitment to support. Sustainability concerns whether physician leaders can continue this work over a career without burning out or being quietly replaced by attrition. Meaning concerns whether the work itself remains connected to why physicians took it on in the first place, rather than being reduced to administrative process. Effectiveness concerns whether the leadership physicians provide is equipped, through training and support, to produce the outcomes it is meant to produce.

Building the compact well

The wider literature on organizational compacts, including work addressed specifically to medicine, converges on a crucial point: the document that eventually describes a compact matters far less than the process that produces it. Jack Silversin and Mary Jane Kornacki, whose account of physician–organization compacts remains among the more practically useful in this space, argue that a compact drafted centrally and handed to physicians for endorsement is not a genuine compact at all, regardless of what the document says.³ What matters is sustained dialogue, patience, and institutional leadership demonstrating that it is not exempt from the

trade it is asking physicians to make. That is, the process of coming to a compact is as important, if not more important, than what is in the compact itself. Indeed, a compact-building process conducted this way is, in a sense, itself an exercise in the same adaptive leadership that physician leaders are often asked to practise elsewhere: bringing people with different values and interests into sustained dialogue rather than imposing a solution from either side.⁴

There is a legitimate objection to formalizing something that has functioned, however imperfectly, as an implicit understanding. Writing a compact down risks reducing a relationship built on judgement and context into a checklist, inviting disputes over compliance rather than the kind of genuine partnership an unwritten understanding can sometimes sustain. This concern deserves to be taken seriously rather than dismissed, and it is likely correct wherever an institution treats the writing of a compact as a substitute for the dialogue that should produce it. But it is not an argument against an explicit compact that is built well. A written compact that emerges from genuine engagement with physicians is evidence that the underlying trust was strong enough to survive being articulated, not proof that the trust has been replaced by paperwork.

A different objection is that this is fundamentally a training problem rather than a compact problem: physicians have simply not been taught to lead, and if health care systems built the right infrastructure, physician leadership would follow without needing anything as abstract as a renegotiated compact. This objection is not wrong, and building that infrastructure is necessary work in its own right. But infrastructure alone does not explain why capable, well-trained physician leaders step back from leadership roles or why physicians who could lead choose not to. Training can teach someone how to lead well; it cannot, by itself, convince them that leading is worth what it costs. That judgement depends on whether the exchange behind the training, what is given up and what is received in return, still holds. Training answers whether physicians can lead. The compact answers whether they will keep doing it.

This work does not need to start from nothing, and it can happen at more than one level: between a ministry of health and a provincial medical association, between a health authority and its medical staff association, or between an individual hospital and its physician staff collectively. Canadian precedent already exists at the hospital level. The Ottawa Hospital, working



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with front-line physicians and physician leaders, developed a Physician Engagement Agreement defining the mutual principles, interactions, and expectations of the hospital and its medical staff, now built into the privileging process itself.⁵ It does not resolve every tension raised here, but it demonstrates that an explicit, negotiated compact is achievable in a Canadian setting, not merely a theoretical prescription borrowed from elsewhere.

Limitations

This viewpoint draws on a selective, narrative review of the compact and psychological contract literature rather than a systematic one, and pertinent work, including material outside the English-language and North American literature, may not be represented here. The Ottawa Hospital's Physician Engagement Agreement is offered as a single Canadian precedent rather than a representative or exhaustive survey of comparable efforts, and its outcomes have not, to this author's knowledge, been independently evaluated in the published literature. Finally, the argument here is conceptual, built from established theory and secondary sources, rather than from new empirical data on how physicians or institutions currently perceive the compact between them. Generating that primary evidence, ideally through direct engagement with physicians and institutional leaders, is a natural next step for this line of work rather than something this piece attempts to supply.

Conclusion

The question of whether physician leadership has been worth it for any individual physician will always be answered privately. But whether it remains worth it for the profession and the institutions that depend on it, as medicine grows more demanding and physician leadership grows more necessary, is not a private question and cannot be answered by assuming that an inherited, unwritten compact will simply continue to hold. What is required, from both sides, is a genuine accounting of what would make physician leadership sustainable enough to last a career, meaningful enough to be worth choosing, and effective enough to justify the investment institutions are asked to make in it. That accounting has not

been done with much rigour so far. It is worth doing properly now, before the next generation of physician leaders must decide, largely on inherited faith, whether to accept terms nobody actually renegotiated.

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Beyond the checkbox: **Rethinking leadership training** in medical education



Eric Michael Hempel, AS, BMLSc, MSc-HSLI

People leadership is a core competency in medicine, yet during undergraduate medical education, it often remains underdeveloped. Although students are exposed to a wealth of clinical practice and social determinants of health content, far less attention is devoted to developing the skills required to guide, empower, and cultivate high-functioning health teams, i.e., people leadership. The consequences can be substantial: hierarchical working cultures, poor staff morale, fragmented supports, and burnout, all of which directly influence health system performance and patient care. Embedding people leadership development meaningfully in the medical school curriculum provides a critical opportunity to reshape workplace culture, strengthen team cohesion, support staff well-being, and ultimately improve patient care. People leadership should not be treated as an optional competency; it is integral to health system resilience, patient care, and the legacy we leave behind.

Key words: leadership, medical education, organizational culture, health human resource, quality improvement

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Leadership begins with people

In a recent leadership interview, as part of the master of science in health systems leadership and innovation curriculum under the Institute for Health Policy, Management, and Evaluation, a physician executive shared: “When I leave my position or I leave the organization, there’s no medal. There’s no monument they’re erecting. There’s no award named after me, but it’s the people that I leave behind. That is the legacy. So, when I say ‘people leadership,’ I mean talent scouting. Unlocking everyone’s potential and maximizing others” (Hempel E. Unpubl. 2025, Institute for Health Policy, Management, and Evaluation, University of Toronto).

At its core, people leadership is about supporting, developing, and empowering others to reach their potential. This becomes especially important in health care, where providing high-quality patient care is fundamentally a team effort. Physicians, allied health, support staff, and many more work collectively to improve patients’ well-being, be it by sharing knowledge and expertise, designing comprehensive care plans, or guiding smooth patient transitions. As such, interprofessional and integrated care models have become more adopted across health systems in recognition of the value of teamwork and collaboration in providing optimal patient care.¹

The 2026 Canadian Conference on Physician Leadership in Montréal, Quebec, explored this concept further, highlighting that positive organizational culture influences patient care just as much as clinical excellence. Patients often notice not only direct interactions with their care providers, but also the way health professionals interact with one another.² Physicians, wearing multiple hats simultaneously, are uniquely aware of organizational culture. They oversee the clinical care of patients, interact with a variety of health professionals to deliver appropriate care, and communicate with upper administration on issues at the front-line.³

An example from British Columbia illustrates the importance of physicians’ role in influencing workplace culture. Multiple emergency department closures across major urban centres prompted a province-wide review of the health care system. Surveys of affected clinicians and staff revealed that respondents felt neglect and burnout after years of experiencing disengaged leadership, as well as unsafe and unsupportive working environments.⁴ This highlights the urgent need for leaders who care, listen, and advocate for their teams and patients — key qualities of people leaders.

So, if people leadership is so valuable to health system sustainability, how are we preparing our future physicians to become people leaders?

Do as I say, not as I do

Medical school is often described as a marathon. To meet rigorous accreditation standards, curricula are densely packed with numerous learning objectives from clinical medicine to discussions around the social determinants of health, mental health, diversity, equity and inclusion, artificial intelligence, and more. Leadership training has also made its way into the mix, as part of the core CanMEDS Physician Competency Framework⁵ adopted by the Royal College of Physicians and Surgeons of Canada, emphasizing that leadership involves engagement in shared health system decision-making, collaboration, and continuous improvement. Notably, although people leadership is not explicitly identified in the framework, several of its core elements are present, including leading multidisciplinary teams to implement change, providing mentorship and guidance to help others develop leadership skills, and maintaining positive relationships with other health professionals. CanMEDS also conceptualizes these competencies as developing progressively across the training continuum, with learners assuming increasingly complex leadership responsibilities as they advance.

For undergraduate medical education, the challenge is translating these competencies into learning experiences that prepare students for the progressive leadership responsibilities expected later in training. Historically, leadership training has been provided through workshops and stand-alone lectures; this hasn't changed much over time.⁶ For example, at the Temerty Faculty of Medicine, University of Toronto (U of T), training occurs in the following ways: senior leaders host introductory lectures exploring basic leadership principles with medical students, patient advocates attend seminars and share their experiences navigating the health system, and students participate in self-reflection exercises exploring the value of leadership in clinical practice.

Although these resources provide an important foundation for students to build on in future clinical practice, in reality much of this learning remains theoretical, with limited opportunities for students to apply and develop their people leadership skills. Such experiences may instead depend on extracurricular involvement through student councils, clubs, or other initiatives, in which access to longitudinal mentorship and structured feedback can vary. For those seeking guided leadership development and mentorship from experienced leaders in the field, these opportunities fall short. In addition, as medical students balance curriculum requirements with the demands of residency applications, leadership training can become diluted and may often be deprioritized.

This begs the question, what can medical schools do to address this challenge and develop the next generation of clinical leaders?

Leading by example

The COVID-19 pandemic demanded an extraordinary response by health care professionals across the globe. The sharp rise in cases soon overwhelmed testing capacity, forcing jurisdictions to implement lockdown initiatives to help curb the spread. Health systems globally scrambled to keep pace with demand. To cope with the situation, thousands of individuals were hired, with or without a health care background. I was one of them.

As a fresh undergraduate in laboratory medicine, my journey in the health care system started at the BC Centre for Disease Control (BCCDC) under the province's chief medical laboratory officer (CMLO). Although I had a strong laboratory background, my understanding of health care delivery and the broader health system level was quite limited. As such, I had a few reservations about assuming a role at the BCCDC during a particularly challenging period, worried that the demands of the position might exceed my abilities.

To my surprise, the CMLO, a physician and health care executive himself, who was overseeing BC's public health labs, mentored me and provided me with a safe space to learn about the organization's operations, processes, and people. He introduced me to team members, consistently remained responsive to questions, and checked on my well-being on a regular basis. As the pandemic evolved and my tenure with the organization continued, the CMLO looked out for me and provided opportunities to grow my skillset, from smaller data analysis projects to successfully running major provincial initiatives supporting the province's COVID-19 pandemic response. Despite the ongoing pressures on the labs, he took time to engage with me, reflecting on my mistakes and celebrating my wins. I felt safe, empowered, and proud to be a member of his team.

Later, when I started medical school training at U of T, I used the people leadership lessons I learned at BCCDC to set up an Objective Structured Clinical Examination (OSCE) prep group for our first-year medical school cohort with a few peers. The OSCE aims to assess students' clinical encounter skills in a standardized manner. Students frequently comment on how stressful it is to properly prepare for these assessments and succeed. Thus, similar to my experiences at BCCDC, students had some initial uncertainty about the OSCE and how to approach it.

Together, my peers and I created a monthly study roadmap that guided our preparation in the months leading up to the exam. We co-designed our schedule with the school's administration team and held weekly sessions for medical students to attend and practise in a safe space. As leads, we introduced the skills for each session, provided individualized as well as group feedback on the execution, empowered individuals to embrace their strongest performance, and celebrated everyone's success after completing the OSCE. Years later, students continue to refer to this experience, commenting on how it helped them to not only pass their first OSCE, but also to mentor others in the same way.

Rethinking leadership education

Recreating a global pandemic just to allow executive leaders to mentor medical students in people leadership should not be the vision. In fact, developing standardized learning experiences for students may take away from the variety of leadership philosophies and applications that are desperately needed in the health care system.⁶

Instead, building on the progressive development approach envisioned in CanMEDS, medical schools should consider a longitudinal, experiential approach to people leadership during undergraduate medical education. This could be achieved by creating leadership opportunities between schools and their local health networks, focused on medical education, quality improvement, and patient safety. By involving students in authentic health initiatives alongside experienced professionals, students could gain hands-on mentorship experience, practise people leadership in an interprofessional care team, and receive structured feedback on their performance, thereby creating a community of practice for leadership development in medical education and beyond.⁷ Drawing on these principles of leadership development and the experiences described above, Table 1 outlines six core elements of a proposed framework for people leadership development.⁵⁻⁷

The benefits are numerous. Students would have the chance to practise their leadership skills away from the classroom setting, while also building professional relationships along the way and contributing to meaningful initiatives in their health network, both of which may support their subsequent residency applications and future careers. Medical schools and health networks can, in turn, smooth the transition for students from medical learners to practising clinicians, while potentially strengthening students' connections to the networks in which they train and promoting homegrown talent. Such relationships may also create opportunities for experienced clinicians to pass

Table 1. Longitudinal people leadership development: an experiential framework for undergraduate medical education.

Core element	Why it matters	Implementation example
1. Psychological safety	Leader creates an environment where medical learners can ask questions, acknowledge uncertainty, take appropriate risks, and learn from mistakes.	Small student teams supported by a consistent physician/faculty mentor, with regular check-ins and a developmental rather than punitive approach.
2. Meaningful & progressive responsibility	Leadership develops through authentic responsibility and increasing autonomy, rather than pure observation or assigning a leadership title.	Embed medical learners in real health system projects. Students progress from understanding the problem and contributing, to leading components, to coordinating others and assuming greater responsibility.
3. People leadership in practice	Provides opportunities to practise relational behaviours that support, develop, and empower others, including listening, collaboration, delegation, trust-building, and navigating disagreement and conflict.	Rotate responsibilities so medical learners experience both contributing to and leading an interprofessional team, with an emphasis on enabling the success of others rather than simply completing individual tasks.
4. Multidirectional feedback & reflection	Leadership is relational; development requires understanding how one's leadership is experienced by others and reflecting on successes, setbacks, and opportunities for growth.	Formative feedback from peers, mentors, project partners, and other relevant team members. Learners identify areas for development and apply them during subsequent phases of the experience.
5. Recognition & celebration	Reinforces that growth, learning, and developing people and teams are valued alongside academic and clinical achievement.	Conclude with a project showcase recognizing different forms of achievement, e.g., collaboration, demonstrated growth, equity, innovation, system impact, and exemplary people leadership.
6. System integration & sustainability	Connects leadership development to genuine health care needs while demonstrating how physicians contribute beyond individual clinical encounters.	Partner with affiliated health organizations to identify authentic system priorities and create pathways for promising initiatives to be implemented, continued, or transferred to future learner cohorts, while fostering longitudinal mentorship and knowledge exchange between learners and experienced clinicians.

Note: This framework represents the author's synthesis of principles from existing leadership education literature and the experiences discussed in this viewpoint.

along their knowledge, leadership practices, and organizational experience to the next generation of physicians. In this way, people leadership becomes not only about developing today's teams, but also about building a legacy through the people who follow. Finally, the health care system could benefit from a fresh source of potential and perspectives early on to lead teams and tackle some of the most pressing challenges it currently faces.

Challenges and opportunities

Of course, setting up a leadership program like this is no small feat. It would require consideration of the variety of competing curricular priorities mentioned previously, faculty and health-system capacity, mentorship availability, and institutional buy-in. Moreover, given that classroom sizes across Canadian medical schools have been growing significantly over time, scalability and equity must be considered since opportunities that depend on motivated students seeking out these experiences may not reach all learners equally.⁸ In terms of assessments, by reducing leadership training to checklists or one-time evaluations, schools risk overlooking the progressive development approach envisioned in CanMEDS. Instead, assessments should use a more longitudinal, experiential approach involving mentorship, multidirectional feedback, and reflection, allowing learners to achieve progressively greater responsibility as they develop their people leadership skills.

Medical schools may not need to build this infrastructure from scratch. U of T's Quality Improvement Experiential Student Training (QuEST) program, which supports a longitudinal, mentored, and health-system integrated experiential learning, is a testament that this work is possible, at least from a scholarly perspective.⁹ Building on existing partnerships with hospital networks to facilitate enhanced leadership training would offer a unique opportunity to extend this experiential model toward the deliberate development of people leadership.

Leadership education as an investment in health care

How do we know when we've succeeded? As one physician executive put it: "To our front line, we know that we've gotten it right when one of our housekeepers can say, 'My job here is to save lives. If I do the terminal room cleans when a patient leaves after having C. diff and I make sure there are no spores so the next person is safe... then I am saving lives'" (Hempel E. Unpubl. 2025). This is people leadership in action: every team member sees their contribution as integral to patient outcomes.

With a wide range of health care issues on the horizon, from ongoing workforce shortages, funding gaps, public and global health emergencies, to the rise of AI, people leadership will be crucial not only to steer teams through uncertainty, but also to create innovative, resilient, and sustainable, high-performing health care systems. Leadership is not measured by titles. It is measured by the people we help grow. Therefore, leadership education should not begin once physicians become department heads or executives. It should begin on the first day of medical school; not as a checkbox exercise, but as a meaningful skill that needs to be developed and celebrated.

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Why **emotional intelligence** is important for physician leaders



Ellen Tsai, MD, MHSc (Bioethics)

Coaching Corner is a collaboration between the Canadian Physician Coaches Network and the Canadian Society of Physician Leaders to highlight the value of coaching for physician leaders, including how they may effectively use coaching skills in their own interactions. This third article in the series tackles the topic of emotional intelligence. The coach works with the physician leader to identify opportunities to enhance their leadership skills through the lens of emotional intelligence. Using a fictional dialogue, our coach again supports the physician by moving from overwhelm toward clarity, prioritization, and intentional action.

KEY WORDS: physician leaders, coaching, leadership development, professional development, emotional intelligence

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In the previous article in this series, Dr. Vargas, a newly appointed department chair, had started working with a coach to support them during their transition into a formal leadership role. The coach helped Dr. Vargas prioritize which aspects of the complex situation they were facing — which included navigating interpersonal conflict, staffing instability, and unclear priorities in a changing department — they would first like to tackle. Dr. Vargas also reflected on how they wanted others to see them as a leader and chose an action plan that was aligned with their strengths and values.



We begin with a fictional dialogue between the coach and Dr. Vargas at their next session.

Coach: What would make this conversation valuable for you today?

Dr. Vargas: Since our last session, I met one-on-one with four people as I had planned — two senior surgeons and two newer surgeons. As you may recall, I am concerned about the negative climate in our department and want to smooth out the conflict before any other surgeons decide to leave. The good news is that the conversations with my two senior colleagues went well, and neither of them plan to leave. Unfortunately, my meetings with the two newer surgeons both ended pretty acrimoniously, and I'm worried that I made things worse.

Coach: What would you like to walk away with by the end of our session?

Dr. Vargas: I would like to have a game plan for the next time I meet with the two newer surgeons. I've set up another meeting with both of them together for next week. I think my goal should be to repair any damage that I may have caused to our relationship during the one-on-one meetings.

Coach: I sense that having good relationships is important for you.

Dr. Vargas: Yeah, I don't want to be a leader who simply tells people what to do.

Coach: What do you think you need to address during our session in order to come up with a successful game plan?

Dr. Vargas: I think it would be helpful to explore what I did wrong, and maybe what I could do differently, so that the three of us end up feeling like we want to work together by the end of the meeting.

***"We are not thinking beings who feel,
we are feeling beings who think."***

— António Damásio¹

This statement aligns with the ground-breaking work of Reuven Bar-On, a psychologist who coined the term "emotional quotient" (EQ) in his 1985 doctoral dissertation.² This shifted understanding of human capability away from viewing "emotions" and "intelligence" as being contradictory.

Although the concept of “emotional intelligence” was popularized by Daniel Goleman’s 1995 bestseller of the same name, the historical roots of this construct can actually be traced back to the nineteenth century.³ Since that time, various psychologists have come to a consensus that the conventional concepts of an “intelligence quotient” (IQ) revolve around a narrow band of linguistic and mathematical skills that predict success in the classroom, whereas “personal” or emotional intelligence is crucial to leading life successfully.⁴

Today, it is widely accepted that effective leaders need people skills to achieve organizational goals. It is noteworthy that three of the seven habits of highly effective people described by Stephen R. Covey⁵ are related to interdependence: interpersonal leadership, empathic communication, and creative cooperation. Professionalism and interpersonal skills are also associated with positive impacts on patient health outcomes and physician well-being,⁶ and a strong correlation has been observed between perceptions of competence and interpersonal skills when it comes to the physician–patient relationship. Furthermore, the risk of receiving medico-legal complaints is associated with negative perceptions by patients about the quality of the interactions with their physician.⁷

Although a number of frameworks and assessment tools for emotional intelligence exist, there are three major conceptual models (Table 1).

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Mantra:

Embrace the present moment, honor authenticity, and build connections that empower, heal, and inspire. True growth is found in aligning actions with values, dismantling hustle culture, and courageously walking the path toward transformation

Table 1: The three major conceptual models of emotional intelligence

Conceptual model	Assessment tool	Domains	Competencies
Salovey-Mayer Four-Branch Ability Model⁸	Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT 2)	1. Perceiving emotions 2. Facilitating thought using emotions 3. Understanding emotions 4. Managing emotions	
Goleman Model⁹	Emotional and Social Competency Inventory (ESCI-360)	1. Self-awareness	Emotional self-awareness
		2. Self-management	Emotional balance Adaptability Achievement orientation Positive outlook
		3. Social awareness	Empathy Organizational awareness
		4. Relationship management	Influence Coach and mentor Conflict management Teamwork Inspirational leadership
Bar-On Model of Emotional-Social Intelligence³	Emotional Quotient Inventory (EQ-i 2.0)	1. Intrapersonal	Self-regard Emotional self-awareness Assertiveness Independence Self-actualization
		2. Interpersonal	Empathy Social responsibility Interpersonal relationship
		3. Stress management	Stress tolerance Impulse control
		4. Adaptability	Reality-testing Flexibility Problem-solving
		5. General mood	Optimism Happiness

Let's return to our fictional dialogue to see how awareness of emotional intelligence may support the development of leadership skills.

Coach: Let's start by exploring what you think went wrong in those meetings.

Dr. Vargas: Although my intention had been to approach the meetings with curiosity, it became clear fairly quickly that the newer surgeons expected me to take their side and were critical that I hadn't been more assertive dealing with the senior surgeons. I found myself defending my actions rather than asking questions to explore and better understand their perspectives.

Coach: Looking back at those meetings, what — if anything — has become apparent?

Dr. Vargas: I have always considered myself to be an empathic surgeon. However, when I completed an emotional intelligence assessment during a leadership course, I scored lower than I expected on that competency. I still think that I demonstrate empathy well with patients. However, I am probably less empathic when it comes to my interactions with other physicians, particularly if I feel my authority is being challenged.

Coach: How aware are you of your feelings in the moment?

Dr. Vargas: It varies. What I do know is that it often doesn't go well when I am already feeling irritable or frustrated ahead of time.

Coach: So, what's the next step?

Dr. Vargas: I probably need to prepare myself before going into the meeting next week with the newer surgeons. I've noticed that I feel more in control if I take a few moments to centre myself between meetings or after dealing with a clinical issue. I think that if I feel calm, I'll have more bandwidth to listen empathically and with curiosity instead of reacting defensively.

They discuss Dr. Vargas' game plan for leading an open, collaborative meeting with the newer surgeons next week. The coaching session concludes with Dr. Vargas committing to monitor their feelings and emotions several times each day to increase their emotional self-awareness.

Conclusion

Being an effective physician leader requires emotional intelligence, as well as intellectual acumen, to navigate complex relationships and challenging health care decisions. Any of the existing conceptual models allows us to identify and measure various skills and competencies that contribute to emotional intelligence. The overall goal is not to restrict emotions, but rather to use information about emotions intelligently to guide our thinking and actions. Unlike personality traits which may be largely fixed from birth, these skills and competencies can be nurtured and strengthened through education, feedback, and coaching.

“Anyone can become angry, that is easy. But to be angry with the right person, to the right degree, at the right time, for the right purpose, and in the right way, this is not easy.” — Aristotle

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Disclosure: Ellen Tsai has completed training and is certified to administer the EQ-i 2.0.

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