

From Data to Action: How Applied Learning Health Systems Turn Clinical Data into Knowledge

Better understanding.
Better decisions.
Better care.

Patience Onuogu, Health Information Manager,
Health Information Services, Cabrini Health Melbourne.

Background

Health systems generate substantial clinical data through routine care; but often fail to translate these data into actionable insights (Enticott et al., 2021).

Applied Learning Health Systems (ALHS) support continuous improvement by converting clinical practice data into knowledge and apply that knowledge to improve patient care (McDonald et al., 2024).

A key insight from a short course on Applied Learning Health Systems at the University of Melbourne was that patterns in routine clinical data, such as frequent emergency department visits among patients with diabetes, can prompt further investigation and inform targeted interventions.

Aim

To illustrate how the Applied Learning Health System (ALHS) framework links practice, data, knowledge, and action through the P2D–D2K–K2P cycle, using a diabetes care scenario.

P2D

Practice to Data



Frequent emergency department visits among patients with diabetes contribute to prolonged wait times and overcrowding.

D2K

Data to Knowledge



A learning community brings together patients' and clinicians' perspectives to develop contextual knowledge and identify contributing factors.

K2P

Knowledge to Practice



The knowledge generated informs targeted interventions that improve care and the patient experience

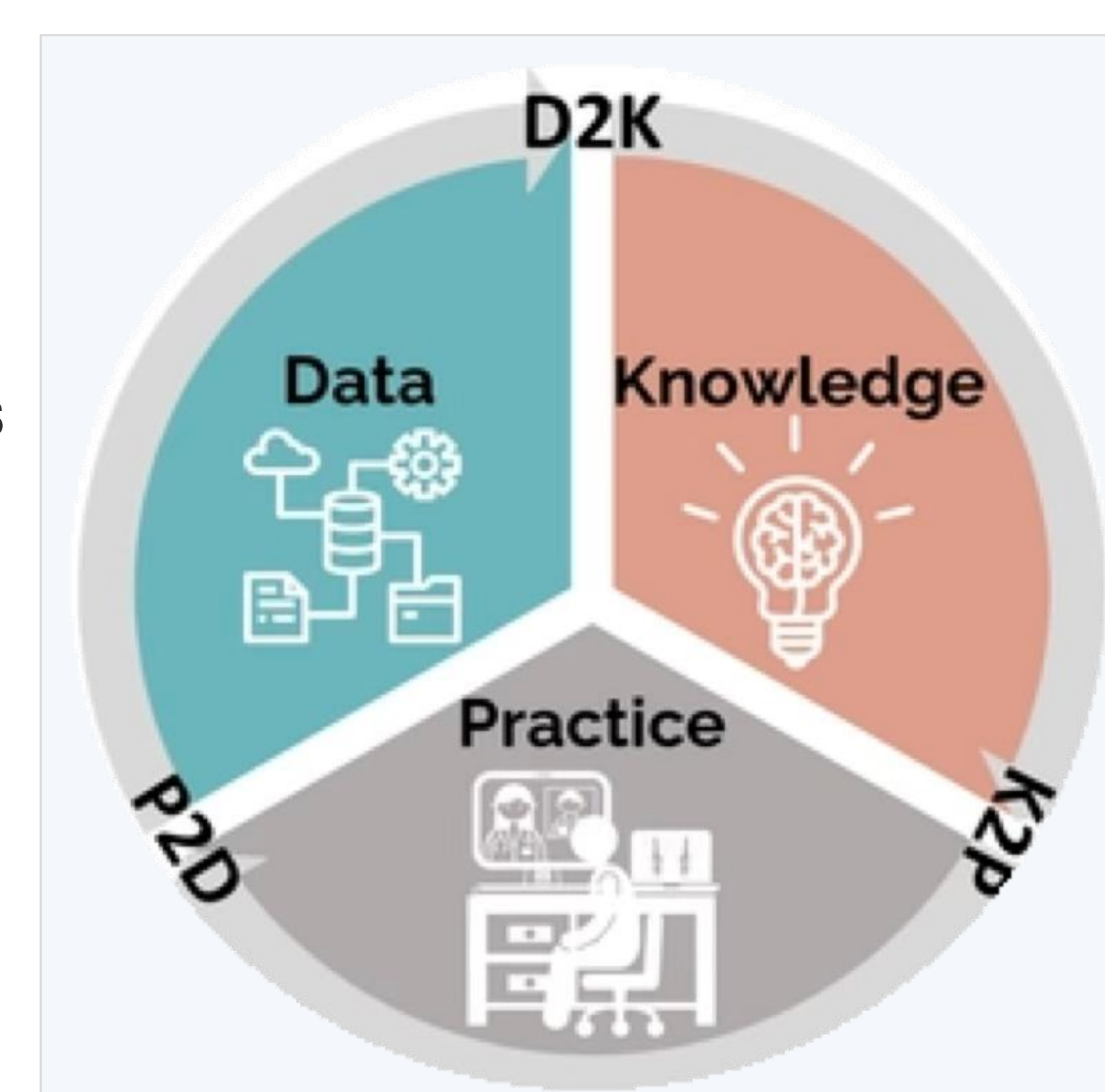
Approach

Drawing on the University of Melbourne's Applied Learning Health Systems course, this poster uses its diabetes care scenario to demonstrate how the ALHS framework applies. The scenario examines a routine care issue through patient and clinician perspectives to inform improvement.

Practice-to-Data (P2D): Frequent emergency department (ED) visits among patients with diabetes contribute to longer wait times and overcrowding. Routine clinical data document this recurring pattern and provide a foundation for further investigation.

Data-to-Knowledge (D2K): This pattern supports exploration of patient and clinician perspectives to identify contributing factors, such as barriers to self-management, medication-related challenges, and gaps in follow-up care. Integrating these perspectives with clinical data provides context for the issue.

Knowledge-to-Practice (K2P): This contextual knowledge can inform targeted interventions, such as optimizing discharge processes, strengthening patient education, enhancing care coordination, and implementing suitable digital health solutions. These changes generate new practice data that support continuous learning and improvement.



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Conclusion

The diabetes scenario illustrates how the P2D–D2K–K2P cycle can transform routine clinical data into actionable knowledge to improve care. This continuous learning cycle shifts routine hospital data from a record of care into a resource for understanding problems to inform healthcare improvements.

References

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