Real-World Clinical Pathway Implementation of Pediatric Guidelines Through Scalable Digital Integration

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JOHNS HOPKINS
MEDICINE
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ALL CHILDREN'S HOSPITAL

TRANSLATING EVIDENCE INTO ACTION

Best Pediatric Hospital in Florida

Johns Hopkins All Children's Hospital (JHACH), founded in 1926, is a 259-bed, tertiary academic pediatric hospital. The Clinical Pathways Program engages >250 physicians, physician assistants (PAs), advanced practice registered nurses (APRNs), nurses, and pharmacists collaborating and contributing across departments.

Care Services:
- 45K+ emergency center visits
- 7K+ inpatient visits
- 318K+ outpatient visits

Real-world Challenges:
- Clinical pathways improve care quality and reduce variation, yet real-world adoption remains inconsistent, especially for pediatric populations.
- Early efforts used static PDFs that were difficult to access, update, and track across service lines.
- To address these barriers, we implemented a scalable, Electronic Health Record (EHR)-embedded infrastructure using AgileMD to integrate evidence-based pathways directly into clinical workflow and measure provider engagement.

Here we describe our systematic effort and demonstrate its early impact through a proof-of-concept pathway (pediatric asthma), highlighting how engaging diverse providers through the EHR tool and feedback loops supported sustained adoption.

Definitions: Translating Evidence into Practice

What The Evidence Says

Evidence-based Resources
- Rigorous systematic reviews, meta-analysis, randomized controlled trials, cohort studies published in high impact journals
- Guidelines from reputable professional organizations (for example, American Academy of Pediatrics (AAP), Society of Critical Care Medicine (SCCM))
- Expert consensus statements and guidelines
- Textbooks, review articles, advisory statements and position papers

How We Care For Patients

Clinical Pathway
- Translates guidelines into frontline care
- Algorithms include local consensus, workflow and resources
- Provider driven
- NOT requirement or policy, allows for clinical decision making
- Decision trees, not linear

Protocol, Policy (HPO), Care Paths
- Nursing or administrative
- Linear, not decision trees
- Standard for ALL patients

How We Operationalize Recommendations
- Order Sets
- AgileMD Guidelines

METHODS & STRATEGIES

Phased Approach to Clinical Pathway Infrastructure

Structure & Governance
- Developed standardized PDF templates, approval process
- Identified core stakeholder teams and trained how to develop & approve clinical pathways

Digital Integration
- Clinical Pathways moved from intranet to public webpage
- Embedded pathways in Epic via AgileMD for real-time access

Engagement, Visibility & Sustainment
- Educated providers, shared usage data, and promoted feedback loops to support adoption

Implementation Framework
- Used a phased implementation model to build and scale a systemwide clinical pathways infrastructure.
- Implementation was guided by stakeholder feedback, governance oversight, and iterative updates to improve usability & outcomes

SCAN TO SEE
JHACH Pediatric Clinical Pathways

Strategy for Challenges

Challenges	Solutions
Inconsistent formats	Standardized templates
Long approval delays	Created governance council
Limited access	Public webpage & embedded into Epic via AgileMD
Sustainability risk	Shared data & engaged stakeholders

Ideal State: How We Create and Update Clinical Pathways

Each pathway follows a standardized process for development, approval, and revision.

Need for Pathway Identified
- Team fills out New Pathway Request Form on connect
- Team is sent a OneDrive link which includes word template and instructions
- EXPIRING PATHWAYS: team is notified of need for update/review

Team Assembled
- Roles defined (owners)
- Key stakeholders identified from multidisciplinary group
  - Minimum of one: provider, nurse, pharmacist
- Important reviewing teams identified (departments, groups such as social work, respiratory therapist, child life etc)

Background Research
- Guidelines from other institutions
- National guidelines (AAP etc)
- Current quality data
- Literature Review
- Current Order set review

Clinical Pathway Development
- Define purpose, objectives and target patient population
- Inclusion and exclusion criteria set
- Algorithm made in word template

Quality Metrics Identified
- 2 metrics to track in addition to LOS
  - Process, outcome, balancing
- Use national benchmarks when possible

Approval
- Clinical Pathways Development Committee signs off
- Team Presents New Clinical Pathway to Clinical Practice Council for approval
  - NICU/Heart Institute/CBDI/IBPS can be approved by local CPC instead
- Multidisciplinary Stakeholder Review & approval

PDF Published Live on Webpage
- Uploaded to website
- Web metrics are tracked

Order Set vs AgileMD
- Operationalizes pathway and will drive ACTUAL care

Implementation
- Frontline teams are notified and educated of new pathway or update (division meetings, newsletters etc)
- Hospital wide marketing (connect)
- Outreach to local referral centers as needed

Monitoring, Analysis and improvement
- Post implementation data tracked and reviewed regularly
- Expectation is that teams will account for variation
- Continuous improvement

Review in 5 years
- Review cycle starts one year prior to expiration

Cycle: REVIEW, DEVELOP, APPROVE, IMPLEMENT

EVALUATIONS & EARLY IMPACT

Program Evolution: From PDFs to Embedded Pathways

Structure & Governance	Digital Integration	Engagement, Visibility & Sustainment

2016 Clinical Pathways Program Launched with 15 pilot PDF Algorithms

2018 Governance structure & Standardized PDF Templates

2020 Public facing website with PDF access launched & EHR transition to Epic

2021 EHR integration via AgileMD

2024 Stakeholder engagement & AgileMD Implementation

2025 New team member increased FTE from 1.0 to 2.0

2026 Program now has over 110 Clinical Pathway PDFs & 13 EHR Integrated AgileMD Guidelines

Over ten years, the JHACH Clinical Pathways Program evolved from static, paper-based algorithms to a scalable digital infrastructure embedded within Epic, enabling consistent access, feedback, and measurement.

Traditional Flow Chart

Johns Hopkins All Children's Hospital
Emergency Center Clinical Pathway

EHR Integrated Algorithms Using AgileMD

- Algorithms are embedded into Epic and provide clinical decision support for providers
- One click orders reduce variation & unnecessary testing
- Real time utilization data allows teams to engage stakeholders in meaningful ways

Clinical Pathway Impacts on Patient Outcomes

Clinical Pathway & AgileMD Impact on Low Value Care:
% of Unnecessary Chest X-rays in Pediatric Asthma Patients

	Baseline No PDFs, no AgileMD Jan 2021 – Nov 2021	Phase 1 PDF live Dec 2021 – Nov 2022	Phase 2 AgileMD Integrated Jan 2023 – Nov 2023	Phase 3 Hospitalist education Dec 2023 – Aug 2024	Phase 4 ER Provider Feedback and AgileMD training Sep 2024 – Oct 2025
JHACH Median LVC Rate (%)	45%	42%	48%	39%	35%

Desired Direction: Existence of clinical decision support tools is not enough, feedback & training leads to improved outcomes

Children's Hospital Association, PHIS Low Value Care (LVC) Inpatient Reports

Clinical Pathway Impacts on Antibiotic Administration Times in Pediatric Sepsis
How Often Are Antibiotics Started Within One Hour Of Sepsis Recognition?

Goal = 85%

	Baseline No Standard Huddle Oct 2020-Sep 2021	PDSA 1 Introduced Huddle & PDF Algorithm Oct 2021-Dec 2021	PDSA 2 Revised Huddle & PDF Algorithm Dec 2021 - Jan 2022	Control Final Huddle & PDF Algorithm Jan 2022 - Jun 2022
% Target* Met	77.3%	63.0%	90.9%	97.4%
% Target* Not Met	22.7%	37.0%	9.1%	2.6%

Desired Direction: Standardized huddles using PDF algorithms improved antibiotic administration times in pediatric sepsis patients

Clinical Pathway	Digital Integration Milestone	Impact
Asthma	AgileMD + provider training of tool	↓ Low-value chest X-rays, ↑ adherence
Sepsis	Standard Huddle Process via Clinical Pathway PDF	↓ Antibiotic timing, systemwide alignment
Sickle Cell	Clinical Pathway PDF & Provider Education	↓ Time to pain medication
Febrile Infant	AgileMD tool	Standardized evaluation & admission rates

*Target= sepsis recognition (CDTZ) to antibiotic start time within 60 minutes for pediatric sepsis alerts in the emergency department

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LESSONS LEARNED & NEXT STEPS

PDF Pathways (static) → EHR Integration (AgileMD) → Stakeholder Engagement + Feedback → Behavior Change & Improved Outcomes

Key Lessons
- Start small and scale intentionally
- Governance = sustainability
- Top-down leadership support is fundamental
- Engage with national groups such as Pathways4Kids to learn from other programs
- Data creates accountability
- **EHR integration alone isn't enough: stakeholder engagement drives behavior change & improves clinical outcomes**

Next steps
- Identify key metrics for each Clinical Pathway
- Build automated data dashboards for utilization and outcome metrics
- Share individualized data with pathway owners and target audiences routinely
- Improve pathway implementation with toolkits and training
- Expand structure to other departments, outpatient centers and sites within Johns Hopkins Health System

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