Mobile Integrated Healthcare Practice: A Healthcare Delivery Strategy to Improve Access, Outcomes, and Value

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The U.S. health care system is often described as one that fails to achieve optimal health outcomes while generating exorbitant costs for patients, payors and society. [1] The Institute of Medicine (IOM) estimates that $750 billion—30% of the U.S. annual health care budget—is wasted on unnecessary services, inefficient delivery, excessive administrative costs and prevention failures. [2] Barriers to patient access, fragmentation of acute and chronic care, ineffective management of chronic illness, and complex, outdated reimbursement processes leave patients, clinicians and payors frustrated at historic levels. In *Crossing the Quality Chasm*, released in 2001, the Institute of Medicine (IOM) Committee on the Quality of Health Care in America described an urgent need to redesign the healthcare delivery system. The IOM emphasized the need to expand information technology and to create payment policies based on innovation, outcomes and performance improvement, rather than on the delivery of care itself. [3] Renewed focus on bringing healthcare to the patient, specifically by delivering care outside of traditional settings, has underscored the need for realignment of financial incentives and reimbursement policy. [4]

A special problem: 24/7 coordinated out-of-hospital care

The discontinuities of health service are notably evident in the care of patients at home; this is particularly true for the chronically ill, frail elderly and mobility impaired. Multiple single-purpose providers offer niche care and often only during restricted hours of operation, neither of which match the actual needs of this patient population.

As a result, patients are routinely referred to hospital emergency departments (EDs) by their healthcare providers, outside of normal business hours, despite the common knowledge that the ED is an imprecise match to their needs. Further, care gaps such as a lack of post-acute transitional care make preventable re-admissions a virtual inevitability that is both expensive and disappointing to patients, caregivers and the health care system.

Mobile Integrated Healthcare Practice

In attempts to correct some of these shortcomings, we propose here a novel delivery strategy for an inter-professional practice of medicine—Mobile Integrated Healthcare Practice (MIHP)—intended to serve a range of patients in the out-of-hospital setting by providing 24/7 needs-based at-home integrated acute care, chronic care and prevention services.

This strategy draws upon the recent experience of disparate experimental mobile health care programs, each addressing specific, often narrow aspects of care as they seek to demonstrate cost savings by reducing short-term re-hospitalization rates or by servicing high system utilizers such as patients with mental illness, substance abuse or other specific social needs. When operated as part of an Emergency Medical Services (EMS) system, these programs have commonly been called "Community Paramedicine" and have emerged as local pilot projects. However, they have typically been confined to defining new roles for existing EMS paramedics and emergency medical technicians, and have not endeavored to demonstrate improved resource integration or value to patients.

Similarly, the Home Health industry has developed targeted readmission reduction programs and transitional care services based on traditional home health practice. The home health profession has been very successful in providing needed care to patients in the home setting but very few programs offer these services 24/7. In addition, current home health delivery must conform to specific regulatory and reimbursement requirements that may limit a more broad application of services.

Despite early enthusiasm for these programs, important questions are now arising about their efficiency, their place in the broader health care system, reimbursement methodologies and financial sustainability. As single-provider / single agency niche programs, they often do not fully engage other elements of the existing healthcare infrastructure. They may fail to effectively or efficiently integrate diverse professional expertise or available care options, and have no shared or recognizably similar features.[5] Further, most of the experimental programs lack sustainable financial frameworks, funded instead internally as "add-on" programs, or by short-term grants. Many such programs still operate as a fee-for-service volume-based model, as opposed to a value-based population health model. Only those programs which have partnered to reduce the financial exposure of existing payers have found a path to scalability and stability.

With a shared unifying strategy framework, it will be easier to reproduce, scale and quantify impacts arising from these out-of-hospital programs. Moreover, failing to meaningfully engage the full range of stakeholders will marginalize these efforts and frustrate inter-professional integration.

We propose MIHP as that strategy framework.

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A Mobile Integrated Healthcare Practice will:

- Focus on patient-centered navigation and offer transparent population-specific care by integrating existing infrastructure and resources, bringing care to patients through technology, communications, and health information exchange
- Define its operations through population-based needs assessment and tools
- Leverage multiple strategic partnerships operating under physician medical oversight
- Improve access to care and health equity through 24-hour care availability
- Deliver evidence based practice using multidisciplinary and inter-professional teams in which providers utilize the full scope of their individual practices and support healthcare delivery innovation

We identified a series of features essential to a comprehensive and accountable MIHP program. These include:

- Cataloging of provider competencies and scopes of practice
- Medical oversight, both in program design and in daily operation
- Population needs and community health assessment
- Strategic partnerships with stakeholders, engaging a spectrum of healthcare providers including, but not limited to: physicians, advanced practice nurses, physician assistants, nurses, emergency medical services personnel, social workers, pharmacists, clinical and social care coordinators, community health workers, community paramedics, therapists, and dieticians
- Patient access through patient-centered mobile infrastructure
- Coordinating communications, including biometric data
- Telepresence technology, connecting patients to resources, and permiting consultation between in-home providers and those directing care
- Capacity for patient navigation
- Transportation and mobility
- Shared/Integrated health record
- Financial sustainability
- Quality/outcomes performance measurement

Population needs that could be well suited for the MIHP strategy include: chronic disease management; unscheduled acute care evaluation and treatment; primary, secondary and tertiary prevention strategies; population health surveillance; culturally competent social services; patient navigation; care coordination; patient advocacy and education.

Currently, access to the U.S. healthcare system is fragmented, often based on a patient's perception of their condition: emergent (e.g, 9-1-1/emergency department), urgent (e.g., nurse advice line/urgent care), or routine (e.g., medical home/walk-in clinic/primary care). Utilizing communication centers that coordinate care using integrated health records, health information exchanges, telepresence technology, real-time call processing and mobile care services can allow patients unparalleled, even around the clock, access to coordinated care.

Philosophically, the MIHP framework is structured to provide patient-centered care, with every effort made to ensure patients receive the right care, by the right provider, at the right place, in the right time and at the right cost. MIHP is a strategy for improving population health indexed to meaningful and measureable clinical and patient experience goals. If the barriers to appropriate timely and cost effective in-home health care are to be removed, an easily reproducible strategy framework must be offered and adopted to facilitate integration among health care providers.

Most importantly, this model must remain patient-centered, with an emphasis on ease of access to care, developing new non-traditional portals of entry, continuity of care and transparency. It is through the synergy of these attributes that care can be improved—safer, more timely, and of higher quality and satisfaction.

MIHP is proposed as a restructuring of care, not a new way to spend additional health care money. In fact, most experimental initiatives in mobile care arena have demonstrated a consistent inability to establish economic sustainability because they operate as "additions" to health care spending. In contrast, the MIHP strategy is designed to support and augment other patient-centered delivery models including the Patient Centered Medical Home, the Chronic Care Model and the Accountable Care Organization by providing an optimized mix of care, likely at costs lower than traditional models. In most cases, it is likely that MIHP could be funded within one of these

models as a cost-optimization strategy based on shared savings.

The essence of the MIHP strategy is that each MIHP program will be unique, defined by local gap analysis and population needs assessment. This process is well validated in public health,[6] and many evidence-based tools are now available to assess local area health care needs, infrastructure and resources.[7-9] Population assessments should be informed by the analysis of health data on specific known health or social issues, by identified gaps in current services, and the insights of stakeholders, including patients and their families.

A needs analysis should lead to development of a local strategic plan which will define how best to incorporate existing community resources, services and personnel into a MIHP program. It is expected that a successful MIHP program will use new partnerships with community stakeholders (patients, payors, ACOs, hospitals, EMS systems, civic leaders and organizations), rather than a "single provider—single agency" design. The strategic plan should include ongoing evaluation based on defined performance measures with quantifiable clinical significance.

EMS systems are easily scalable to absorb the additional loads arising from such a new mobile health strategy with minimal marginal cost.

After considering the range of existing mobile health assets, we conclude that the most common existing mobile health care system—the Emergency Medical Services (EMS) system—is well suited to host the MIHP and coordinate service delivery by multiple providers.

In most communities, EMS systems and personnel are uniquely positioned to support MIHP. EMS systems in the US already treat five to ten percent of the U.S. population each year in response to requests for "emergency" care. With less than three percent of such contacts involving life-threatening injury or illness, most of this care would be more accurately described as "unscheduled health care". More often than not, this care poorly navigates patients, with emergency departments serving as the only care option available. This mismatch is complicated in many communities by longstanding economic models in which EMS is entirely reliant on billings which arise only when an EMS transport to hospital actually occurs.[4]

The infrastructure required to provide such care, and the skill to deliver it in the spartan, often chaotic out-of-hospital environment makes EMS ideally suited as a focal resource in MIHP. EMS currently exists in virtually every community, is linked to all levels of care through its 24/7 capability for mobility and readiness, with an equipped workforce expert in planning, coordination and communications.

EMS systems also possess capital-intensive, difficult-to-replicate readiness infrastructure ideally suited to MIHP such 24/7 vehicle fleets, robust voice and data communications systems, portable biometric devices, electronic medical record systems and treatment equipment. Since much of this infrastructure possesses redundancies and excess capacity essential to emergency preparedness, EMS systems are easily scalable to absorb the additional loads arising from such a new mobile health strategy with minimal marginal cost.

When linked with request-for-service information from dispatch systems, geographic information systems and population health data, the existing EMS infrastructure provides a powerful tool for launching and supporting MIHP.

Even the experiences of EMS systems themselves demonstrate the mismatch and inefficiencies of traditional care models. Previous studies have reported that up to 34% of Medicare patients transported by EMS to an ED could have been safely treated in an alternative setting.[10] A draft white paper jointly published by the US Departments of Transportation and Health and Human Services cites that approximately 15% of all Medicare EMS transports to an emergency department could be considered avoidable visits if EMS triaged or transported to a clinic-based

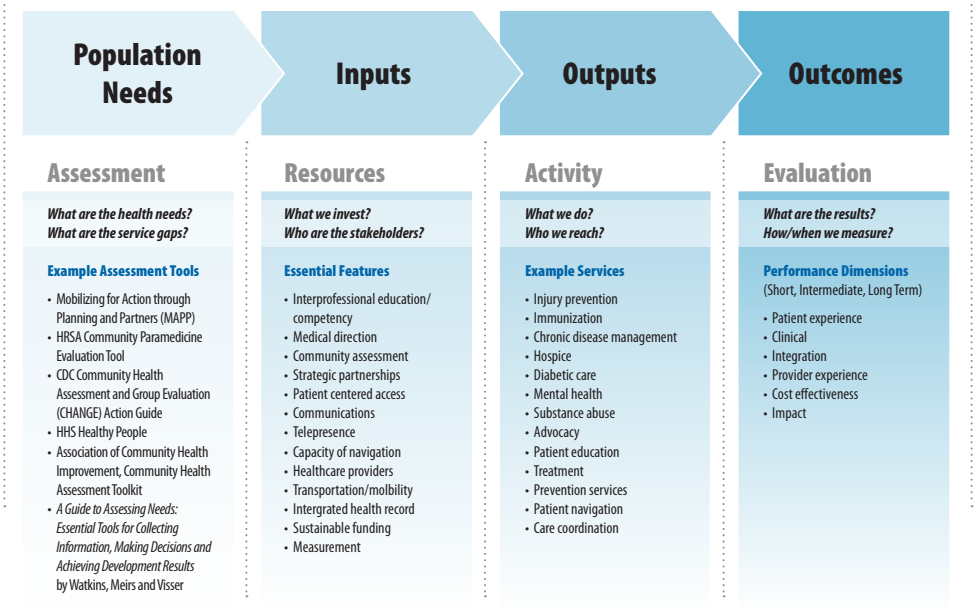
provider. [11] Further, in most EMS systems, between 20 and 30% of EMS emergency responses do not result in a transported patient for a variety of reasons, including patient refusal of care against medical advice, on-scene treatment without transport, and calls where the incident failed to produce a treatable patient. [12]

In some communities, regulatory change will be required to maximally leverage the EMS system in a historically unconventional role for non-emergent healthcare delivery. The classic role and expectation of EMS providers, regulatory constraints, payment structures and a skill set focused on intervention in specific medical emergencies have all prevented EMS from fully participating in more comprehensive health care delivery. In nearly all communities, EMS providers—and EMS systems themselves—operate in obsolete and restrictive regulatory frameworks designed 40 years ago or more. For instance, many state's regulations prohibit EMS resource from assisting any patient other than those who chose to call 9-1-1 as their point of entry to care. In addition, most EMS systems are funded by fees charged for transportation to the hospital rather than for effective clinical services,[4, 13, 14] an incentive structure which actually contributes to waste and missed opportunities in health care delivery.

We recognize that EMS may not play a central role in certain austere environments such as those where emergency medical service is provided solely by volunteers or other scenarios. In these settings, local public health agencies, hospitals and primary care practitioners may need to play a pivotal role in the design of MIHP, but the infrastructure provided by those systems will be of value.

Finally, MIHP will require evolution in the skills of its care providers. Regardless of an individual professional's previous training and experience, it is anticipated that MIHP will require additional competencies to address the highly inter-professional nature required within MIHP, how MIHP integrates care, and how its technologies facilitate patient care goals. [15] Competencies and curricula for MIHP must support the philosophy, essential features and tenets of this new practice model.

Figure 1: Mobile Integrated Healthcare Practice Logic Model



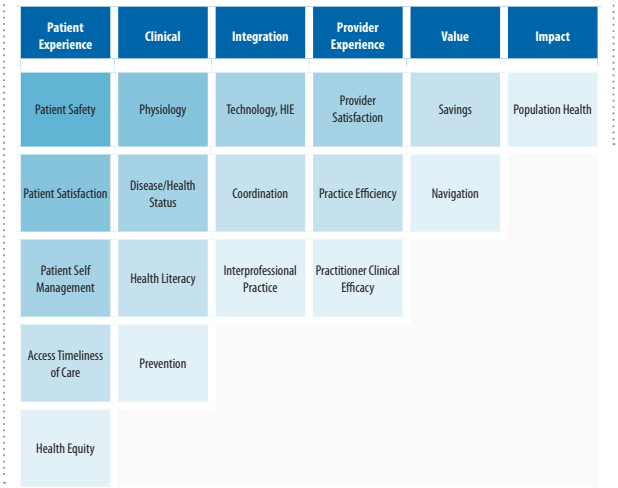
Conclusion

Mobile Integrated Healthcare Practice is a strategy framework to redesign current mobile healthcare through inter-professional collaboration and repurposing of existing healthcare infrastructure. MIHP programs are characterized by leverage of resources such as the existing EMS system in new partnerships with the larger healthcare community to support timely care and effective patient navigation in 24/7 care brought to the patient.

The MIHP approach differs from existing out of hospital care programs in its synchronized multi-provider patient-driven partnerships, defined by local needs and resources. It responds to the growing evidence that "single-provider/single agency" care models will not optimize expertise for patient results, will be too limited in capacity, and are unlikely to be financially sustainable.

We urge stakeholders, relevant national organizations, agencies and patients to develop working groups with content expertise to further define the components of MIHP, design needs analysis tools, formulate performance metrics, and define provider competencies and curricula based on the MIHP tenets of practice.

Figure 2: MIHP Performance Dimensions



Mobile Integrated Healthcare
Examples of MIHP

Location	Impacts	EMS	Call Center	Hospital	Primary Care	Mental Health/Detox	Cardiology	Pharmacy	Telemonitoring	Assisted Living	Hospice
American Medical Response Arlington, TX	Reducing CHF readmissions	♦		♦	♦						
	Decrease utilization of EMS by high utilizers	♦		♦	♦						
University of Chicago Medicine Chicago, IL	Reducing CHF Admissions	♦		♦	♦		♦	♦	♦	♦	
MedStar Mobile Healthcare Fort Worth, TX	Reducing Hospice Revocation	♦			♦						♦
	Decrease utilization of EMS by high utilizers	♦	♦	♦	♦						
	Reducing CHF readmissions	♦	♦	♦	♦		♦				
Wake County EMS Raleigh, NC	Decrease utilization by patients who fall	♦	♦	♦	♦						
	Decrease utilization by patients with substance abuse and mental illness	♦	♦	♦		♦					
Barnes-Jewish Hospital/Abbott EMS Saint Louis, MO	Reducing CHF, AMI, COPD, and pneumonia readmissions	♦		♦	♦		♦				

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