



Mobile Health for Mental Health (MH2™) Using Technology to Improve Delivery of Mental Health Care

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DISCLOSURES OF POTENTIAL CONFLICTS			
Source	Research Funding	Advisor/Consultant	Employee
PCORI	BZ		
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NIH/UCLA CTSI	BZ		
California DHCS	BZ		
NICHD	BZ		
AHRQ	BZ		
UCLA			BZ, EP, AM, YC, MM, BH, PC, SY
LAC DMH			KW
CFGC			AP
Otsuka		BZ (Focus group participant, 12/14/14)	

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OBJECTIVES

- To describe the feasibility and acceptability of MH2™ (Mobile Health for Mental Health), a web-based mobile health app developed to optimize stimulant medication treatment of children with ADHD.
- To describe pilot study in progress to 1) adapt MH2™ for use in a general pediatric clinic and 2) to test its feasibility and acceptability using a mixed-methods proof of concept study design.

SIGNIFICANCE

- Improving quality of child mental health care is national priority area¹
- ADHD affects 3-9% of U.S. children and is debilitating, chronic, and costly^{2,3}
- Most children & adolescents with ADHD treated by primary care⁴
- Poor adherence to ADHD treatment guidelines in primary care
- National Quality Strategy: promote person-centered care, patient-provider communication and adherence to recommended care processes⁵
- AACAP's *Back to Project Future* initiative: Goal 5- Role of CAPs as educators and collaborators with child serving systems of care; Goal 8- Incorporate evolving technological advances into clinical practice (incl e-health)⁶

Potential for High Public Health Impact

- Facilitate accurate reporting by parent and teacher
- Support clinician documentation of meeting treatment guidelines
- Improve quality of parent-provider communication
- Increase efficiency of health care visits
- Reduce child exposure to ineffective medication or side effects
- Facilitate collaboration with primary care and reduce reliance on CAP
- Currently also in Spanish; adaptable to additional languages

INITIAL PILOT

Using a proof of concept study design, app feasibility assessed through the first three follow-up medication visits. Data sources included: 1) after-visit parent surveys; and 2) time-stamped data from the app's user activity log. Sample was 9 low-income parents whose children (ages 5-11 years) were receiving first-time stimulant medication in 2 community mental health centers (Augustus Hawkins Mental Health Center in South LA and Child & Family Guidance Center in San Fernando Valley). App was available in English and Spanish. Average parent-reported medication adherence rates were 84-90%, substantially higher than those reported among children served in Medicaid-funded mental health programs in Los Angeles County.

MH2™ APP FEATURES

Parent Interface (Smartphone)

Reminders & info:

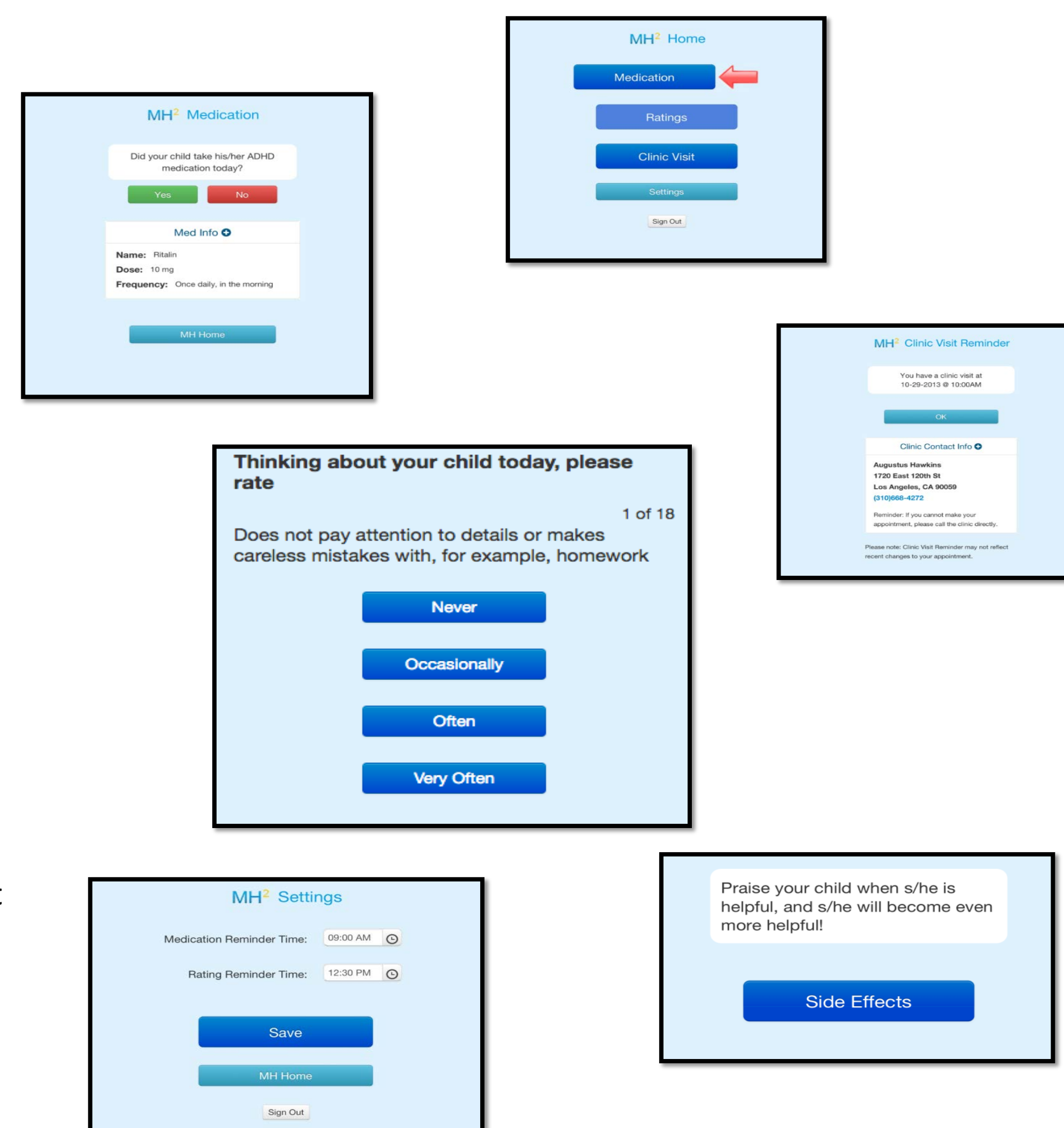
- Medication
 - Daily adherence prompt
 - Name, dose, schedule
- Clinic visit appointments
 - 1 week, 3 day, 1 day prior

Symptom & side effect ratings:

- Daily standardized rating scales.
- Teaches parent how to monitor med. efficacy & side effects
- Compliant with national tx guidelines

Other features:

- Parent receives an education/support reply after completion of each task
- Parent sets reminders for times convenient for them



Provider Interface (Tablet)

Aggregates symptom and side effect ratings from parent and teacher:

- Capacity to drill down by:
 - Medication adherence
 - Inattentive versus hyperactive symptoms
 - Physical versus emotional side effects

Medication adherence report:

- Clarify missing dates with parent during visit
- Update and recalculate adherence rate

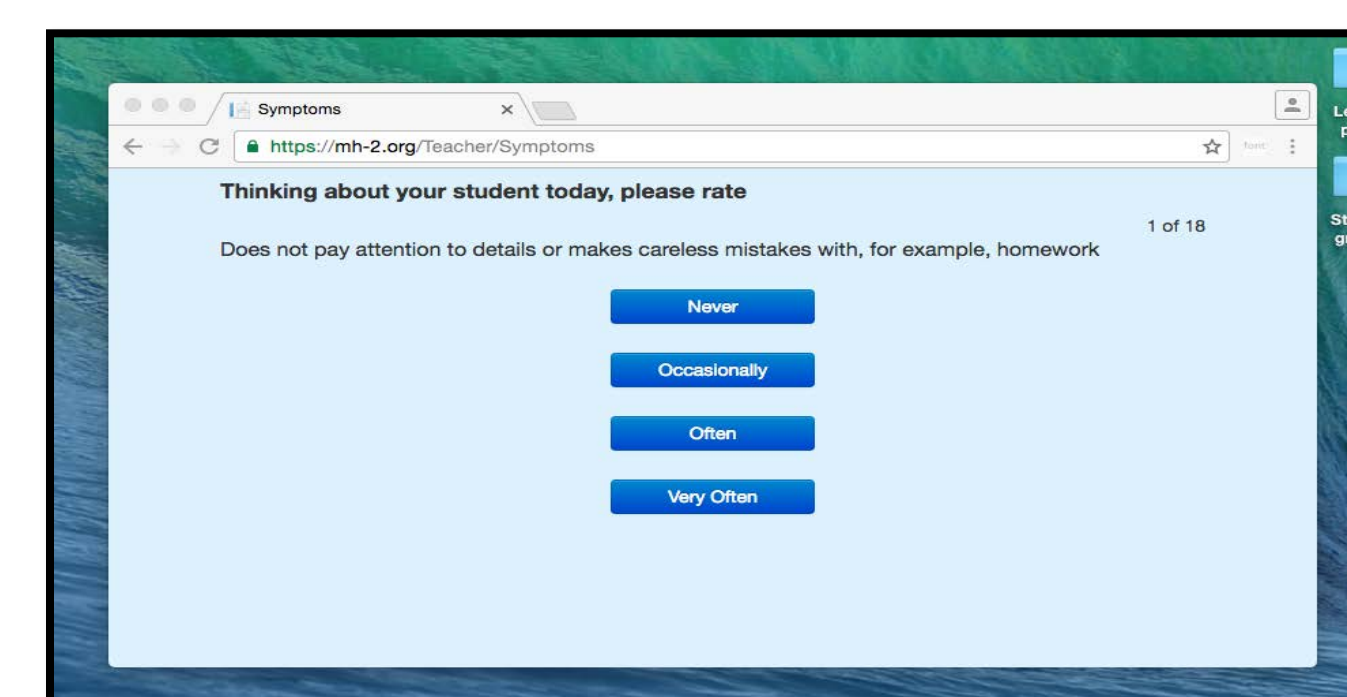
Capacity to enter next clinic visit appointment:

- Updates information in parent smartphone
- Sets dates internally for new clinic visit reminders



Teacher Report (Web-based)

- Twice weekly symptom ratings
- Meets national recommendations to rate symptoms in more than one setting



PEDIATRICS PILOT

Using a proof of concept study design, app feasibility will be assessed through the first three follow-up medication visits.

Study site: UCLA Pediatric Continuity Care Clinic (LA) – pediatric resident clinic

Study design: Proof of concept

Inclusion Criteria: ADHD diagnosis, age 5-11 yrs, first-time stimulant medication prescription or restart after significant gap in treatment, Spanish or English (app available in both)

Data sources: 1) after-visit parent surveys; and 2) time-stamped data from the app's user activity log

Time points (4 total): baseline, f/u med visits 1, 2, 3

Time intervals (3 total): T1: baseline-f/u med visit 1, T2: f/u med visit 1-2, T3: f/u med visit 2-3

Subject recruitment and data collection underway. Anticipated sample size: 12-24 parent-child dyads

CONCLUSIONS

Initial Pilot: Parent use of MH2 is feasible and was sustained during early medication titration.

Average medication adherence rates were substantially higher than those reported elsewhere for Medicaid-funded mental health programs in LA County.

Peds Pilot: Pilot testing of MH2 to optimize early stimulant medication treatment of ADHD in a pediatric setting is ongoing. Further refinement of app and outreach tools is necessary.

FUTURE DIRECTIONS

- Improve outreach to pediatrics for both subject recruitment and feedback on how to make app more effective in pediatric setting – creating outreach “toolkit”
- Optimize parent interface to reduce user fatigue (e.g. ask certain questions more or less often)
- Make app more flexible (e.g. allow provider or parent to adjust med dosage between visits)
- Allow provider to view real-time metrics between visit, or to have app alert provider between visits for “red flags” (e.g. med compliance drops below certain level, dangerous side effect reported, etc.)

REFERENCES

- US Department of Health and Human Services; US Department of Education; US Department of Justice. Report of the Surgeon General's Conference on Children's Mental Health: A National Action Agenda. 2000. Available at: <https://www.ncbi.nlm.nih.gov/books/NBK44233/>. Accessed 6/8/17.
- Merikangas KR, He JP, Burstein M, Swanson SA, Avenevoli S, Cui L, Benjet C, Georgiades K, Swendsen J. Lifetime prevalence of mental disorders in U.S. adolescents: results from the National Comorbidity Survey Replication—Adolescent Supplement (NCS-A). *J Am Acad Child Adolesc Psychiatry*. 2010; 49:980-989.
- Bussing R, Mason D, M., Bell L, et al. Adolescent outcomes of childhood attention-deficit/hyperactivity disorder in a diverse community sample. *Journal of the American Academy of Child & Adolescent Psychiatry* 49.6 (2010): 595-605.
- Bussing R, Zima BT, Belin TR. Variations in ADHD treatment among special education students. *J Am Acad Child Adolesc Psychiatry*. 1998;37: p. 968-976.
- U.S. Department of Health and Human Services, 2011 Report to Congress: National Strategy for Quality Improvement in Health Care. Agency for Healthcare Research and Quality, Rockville, MD. Available at: <https://www.ahrq.gov/workingforquality/reports/2011-annual-report.html>. Accessed 6/8/17.
- MacIntyre J, Pruitt D, Houston M, Martini R, Ryan N, Varley C. Back to Project Future: plan for the coming decade. Washington, DC: American Academy of Child and Adolescent Psychiatry. 2014.

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