



IS THERE AN APP FOR THAT? PATIENT AND PROVIDER PREFERENCES FOR MOBILE PHONE APPS THAT PROMOTE HYDRATION AS A STRATEGY FOR INCREASING URINE VOLUME AND DECREASING STONE RISK

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Introduction

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- A role for mobile phone technology in health care is proposed.
- Mobile phone apps (MPAs) promoting hydration are available**, but little is known about their stone-specific utility and of patient-desired features.
- We identified MPA features desirable for stone prevention purposes and determined patient preferences and enthusiasm for MPA technology.

Objective

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- To determine if currently available hydration MPAs satisfy patient and provider preferences for an “ideal” app that could be used by patients seeking to increase fluid intake and urine output.

Methods

INITIAL DATA COLLECTION

- App search.** An extensive search of the IOS App store, using the words “fluid” and “hydration,” May-Aug 2018 was completed.”
 - 115 MPAs were identified**
- Categorization of features and functions.** In an iterative process, each MPA’s features or functions were then categorized using those listed on each MPA’s Preview.

ITEM GENERATION FOR PATIENT SURVEY

- Seven common hydration-related functions related to user interface were identified among the 115 apps**
 - (1) Reward system, (2) longitudinal tracking, (3) alert, (4) smart watch compatibility, (5) supportive graphics, (6) social aspect, and (7) no-cost download.

APP SURVEY

- A patient survey was designed for rating the 7 MPA functions; each item was ranked on a 5-point Likert Scale.

PROVIDERS

- Stone clinic providers were asked to identify “must have” features of an MPA suitable for use by patients seeking to increase fluid intake and urine output.

Results

PROVIDER PREFERENCES

Providers identified 2 functions as required:

- Customizable goals.** While many MPAs had automatic input goals or calculated goals based on users’ age, weight, and sex, provider consensus was that **users should be able to input their own fluid intake goal as not everyone requires the same amount of fluids to produce goal urine output.**
- Reference to “fluids” vs. only water.** While many MPAs referred to water alone as a fluid source, consensus of providers was that **use of all fluids should be encouraged as this aids patient compliance and adherence.**

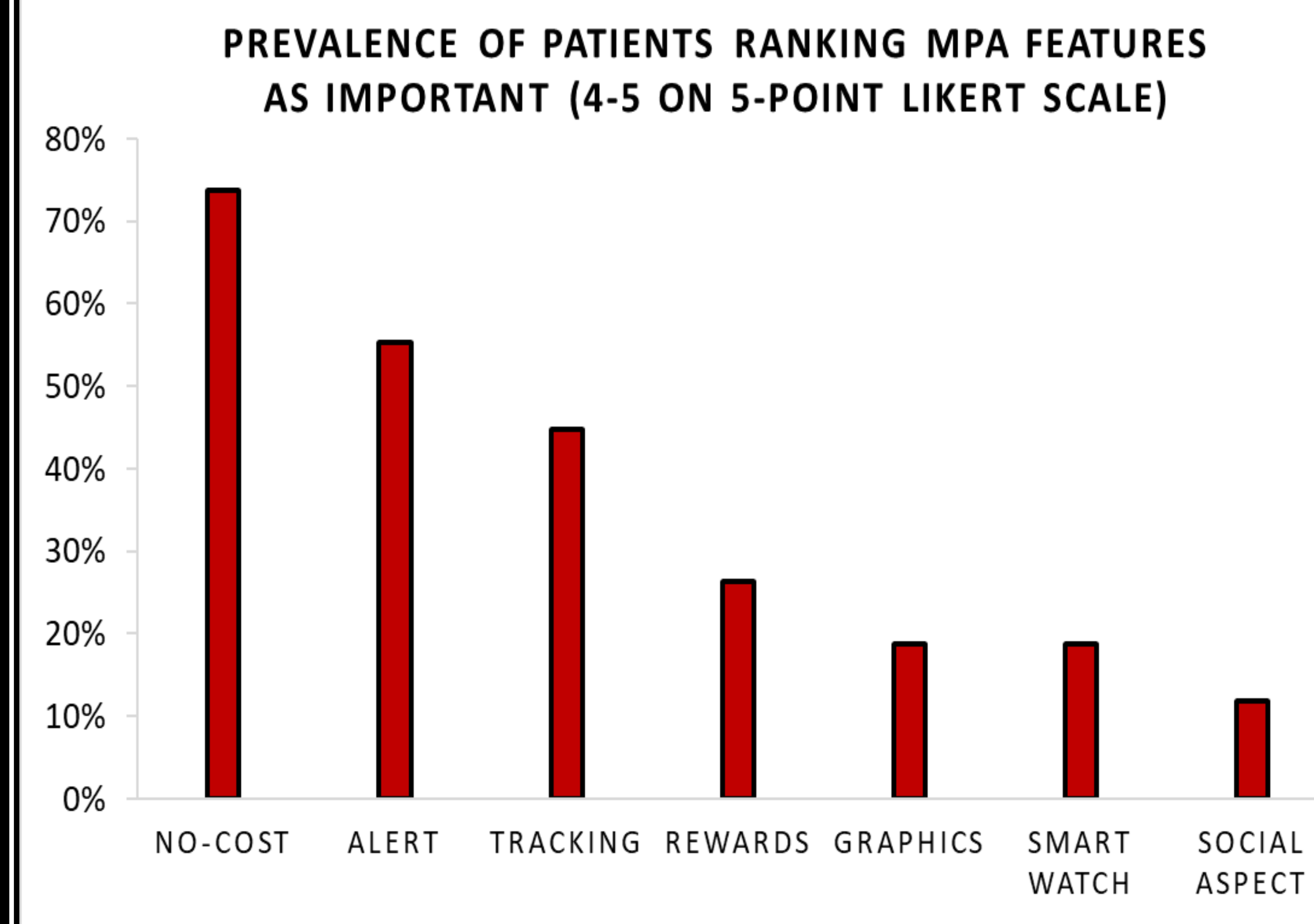
PATIENTS

- Stone formers (n=74) from our multidisciplinary metabolic stone clinic completed the survey.
- Nearly 50% (n=34) were female; overall age was 50 ± 15 (median 56) y; and the majority (70%) had low urine volume, defined as <2.5 L urine in a recent 24-hour collection.



RESULTS: PATIENT PREFERENCES

- Overall, $\geq 50\%$ of patients rated 3 of the 7 functions very highly (i.e., as a 4 or 5 on 5-point Likert Scale): **(1) no-cost download; (2) alert function; and (3) longitudinal tracking ability.**



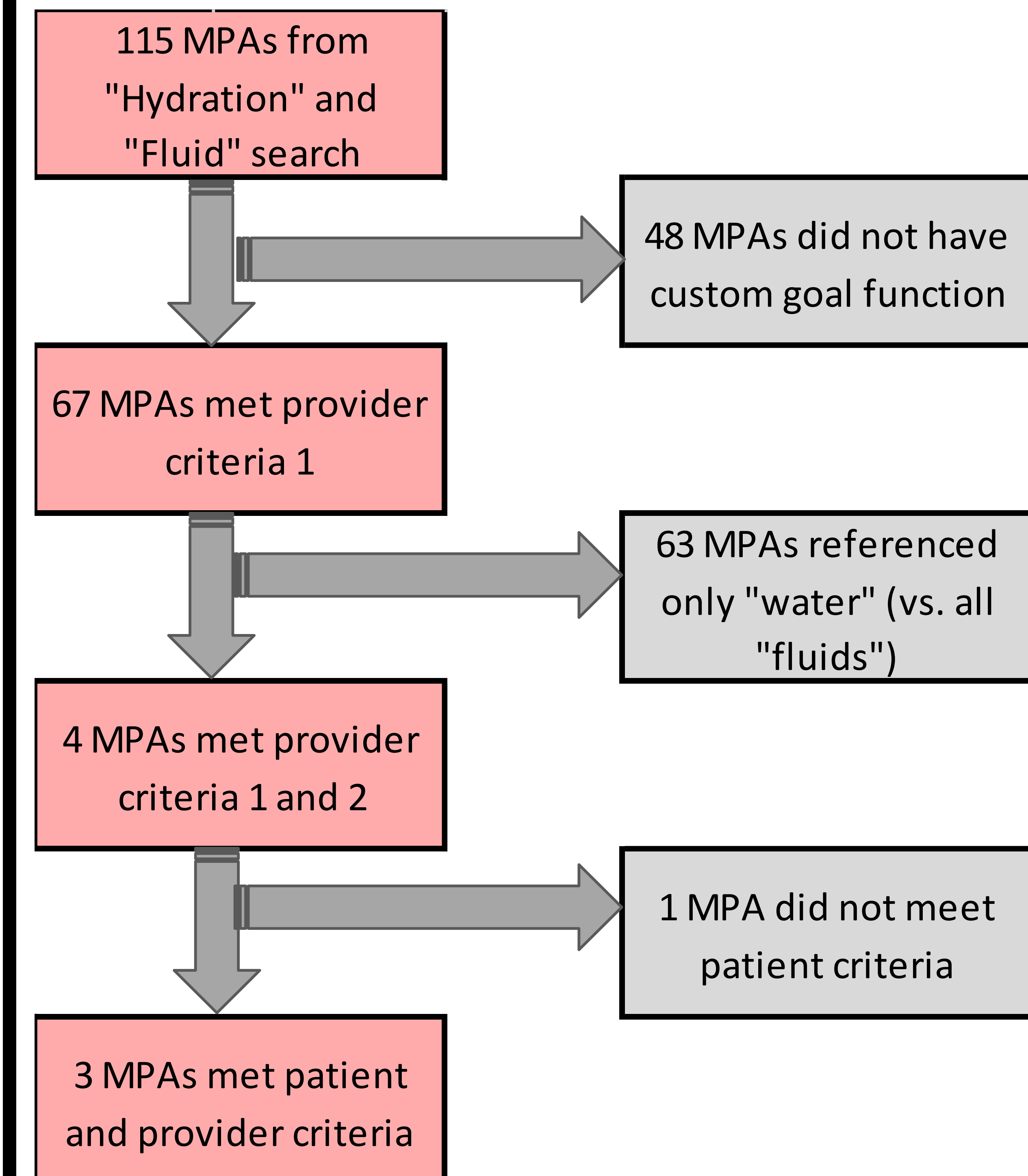
RESULTS: PATIENT CORRELATIONS

- Women ranked **no-cost download** as more important than men ($P=0.03$ for difference)
- Enthusiasm for **rewards/challenges/streaks** was strongly inversely correlated with age in females ($R= -0.58$) but not males ($R= -0.14$)
- Enthusiasm for a **social aspect** was inversely correlated with age in females ($R= -0.56$) but only moderately so in males ($R= -0.33$)

Of 115 MPAs, only 3 (2.6%) had the five elements deemed essential by both patients and providers



The figure below shows the number of hydration MPAs that met both patient- and provider-identified criteria



Conclusion

Patients’ most desirable features for patients were **no-cost download, alert system, and longitudinal tracking.**

Providers prioritized **customizable intake goals** and inclusion of **all fluids** as hydration sources.

Few existing hydration MPAs offered all features deemed most desirable by our patients and providers; none of these MPAs cited kidney stone prevention as a potential application

A kidney stone-specific MPA for increasing fluid intake and urine output is warranted.