



# Clinical Ethnographic Research in Pediatric Urology

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## BACKGROUND

- Learning about and engaging in the biodesign innovation process empowers both medical trainees and health care providers to take action and address the shortcomings of health care encountered in daily clinical practice [1].
- Opportunities for medical innovation within this clinical setting were identified through clinical immersion and interviews of patients, patient families, and health care staff.

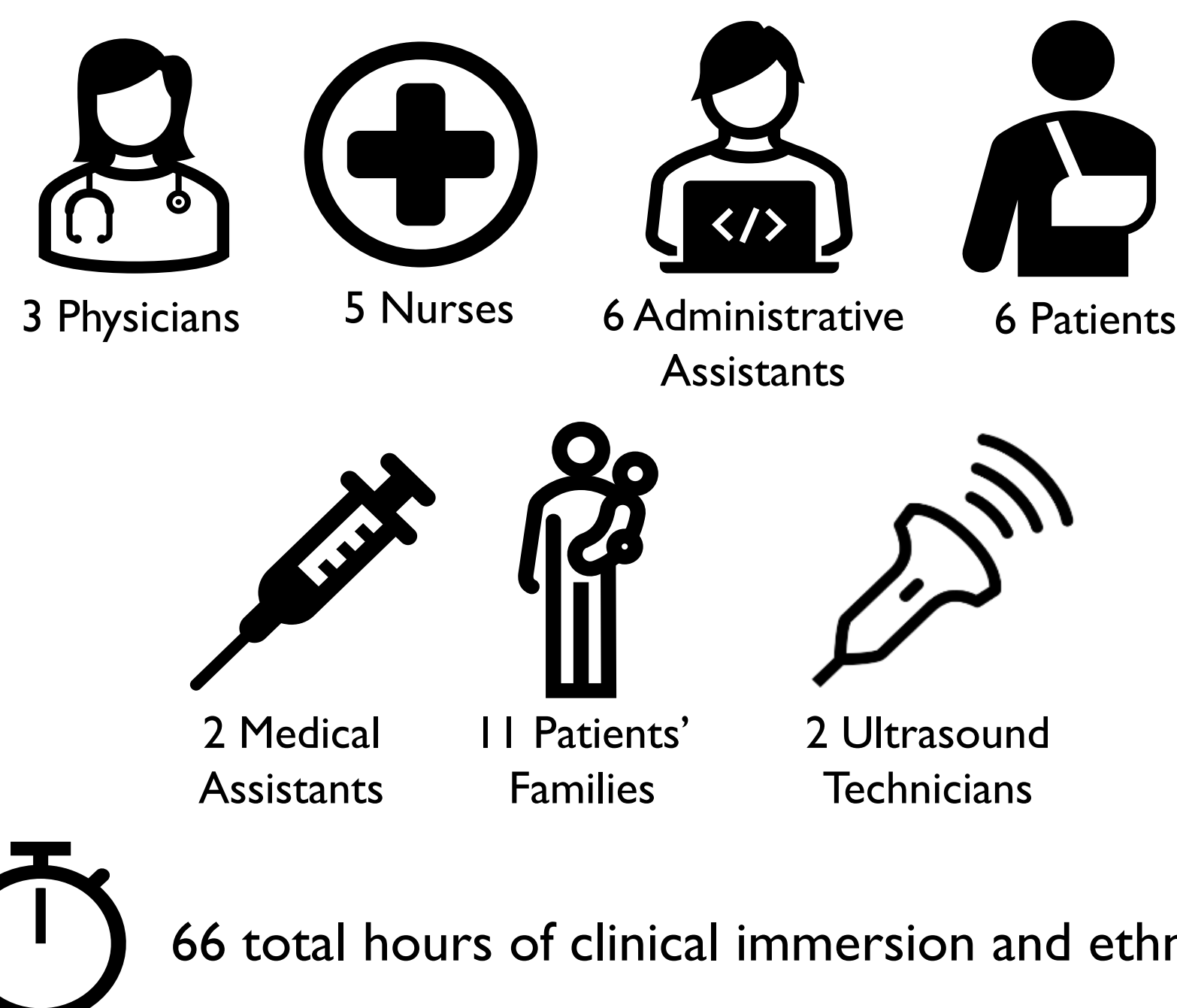
**Q: What are the most pressing unmet clinical needs within pediatric urology at UCLA?**

- This research question was addressed at the Westwood and Santa Monica pediatric urology clinics at UCLA under the supervision of Renea Sturm, MD.

## METHODS

- This ethnographic research study ran from June 1<sup>st</sup>, 2021 to July 13, 2021.
- The spiral model of Biodesign was followed to conduct needs finding and solution landscaping. Observation (clinical ethnography) and interview-based insight extraction was performed.
- Follow up interviews with health care providers, patients, and patient families were conducted to further explore possible unmet clinical needs.
- Needs validation was continuously performed. Needs identification, prioritization, and selection, and solutional landscaping and development was performed
- Surveying techniques such as qualitative insight extraction were implemented to validate needs through repeated clinical immersion.

### 35 Stakeholders Interviewed



## RESULTS

### 3 Top Unmet Clinical Needs:

- Parents and children need a way to better address nocturnal enuresis (nighttime incontinence) in order to decrease burden associated with bedwetting alarms at night.
- Pediatricians and parents need a better way to monitor children for retractile testes in order to reduce unnecessary surgical procedures and referrals to pediatric urologists.
- Physicians and patients need a way to reduce complications and hospital readmissions associated with post-operative urethral catheter kinking after hypospadias repair procedures.

### Market Analysis for Top Need

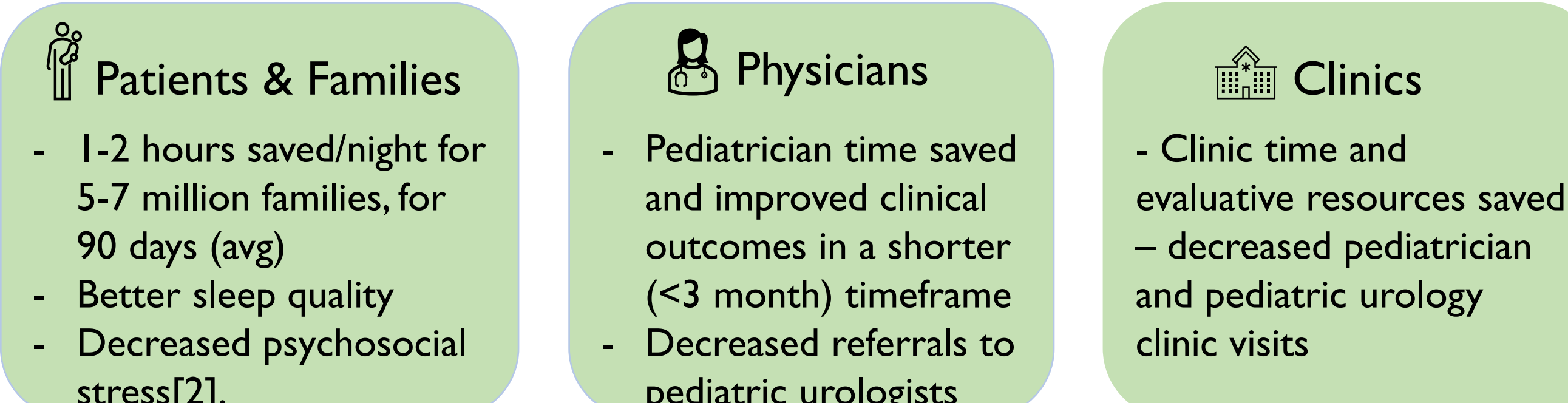
	Segment Size	Max cost per device	Total impact per year
TAM	~150 million children/yr (World)	\$100	\$15 billion/yr
SAM	~6 million children/yr (US)	\$100	\$600 million/yr [2]

### Genealogy Mapping for Top Need

Underlying Problems	Root Causes	Innovation Targets
Kids who are deep sleepers often do not hear the alarm; kids dealing with bedwetting also are more likely to be deep sleepers	Deep sleep may be a root cause of bedwetting Alarms are not effective in arousing deep sleepers	Additional methods (beyond alarms) to arouse deep sleepers Improve alarm so it can wake up deep sleepers
Alarm system is disruptive and burdensome for patients; patients and parents/caretakers will lose sleep	Alarms can be heard by others and unintentionally wake up additional household members	Improve alarm so it wakes up the child without waking up additional household members Another method of arousal that does not disturb household members
Moisture sensor alarm only wakes the child up once bedwetting has already occurred	Moisture sensor alarm does not prevent accidents	Decreasing the frequency of bedwetting itself will decrease burden on parents/caretakers

### Value Proposition for Top Need:

Detecting nocturnal enuresis before accidents occur, without waking the patient up, and with treatment occurring in <3 months will reduce burden and improve sleep quality for families - and also reduce burden on clinics and physicians.



## DISCUSSION

- Nocturnal enuresis** is the most common urologic complaint in pediatric patients. 5-7 million children (ages 5-15) are affected each year, and 15% of US children are affected at age 5. It is associated with psychosocial consequences.
- Treatment involves lifestyle changes (decreasing fluid intake, timed voiding), sleeping devices (bedwetting alarms), and medications
- Moisture-sensing bedwetting alarms** - 70% success rate for long-term dry nights and are affordable (\$30-100).

#### Drawbacks:

- >3 months for families to see any response and 4+ months to achieve dry nights [2-3].
- Requires cooperation/motivation from the child and family.
- Does not prevent urination at night



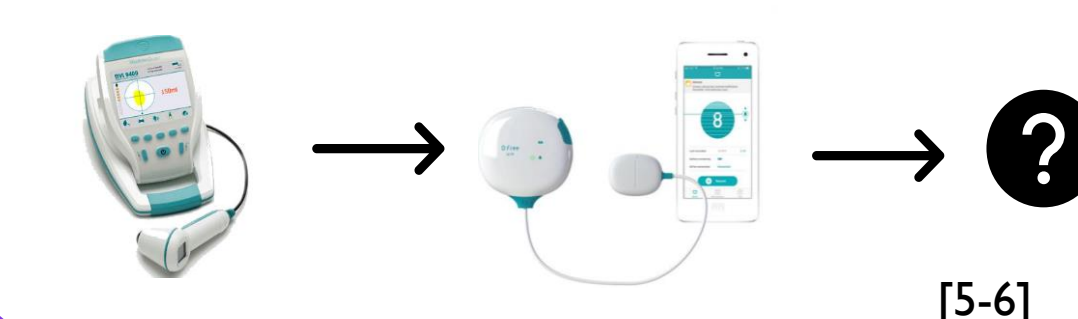
Image 1. MALEM © Bedwetting Alarm [4]

**General solution concept:** Achieving control of autonomic/involuntary activity prevents both accidents and unnecessary arousal from sleep.  
**Goals** 1. Prevent accidents; 2. Prevent unnecessary arousals from sleep

## FUTURE DIRECTIONS

### Detection System Options

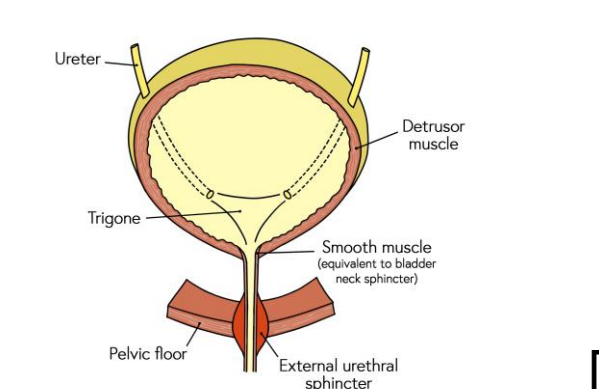
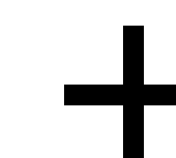
- Submucosal or dermal bladder pressure sensor
- Bladder volume measurement device (e.g. BladderScan) adapted for continuous volume monitoring while child sleeps
- (existing) Moisture-detecting sensor placed in underwear



[5-6]

### Response System Options

- Low-voltage electric current directly stimulates internal urethral sphincter muscle to contract (autonomic)
- Low-voltage electric current stimulates sympathetic fibers of hypogastric nerve (autonomic)



[7]

- Gain more granular feedback and need characterizations from pediatricians and alarm users via a survey.
- Is our preliminary solution concept specifically indicated as a first-line or later-line treatment option for nocturnal enuresis?
- Segment subgroups for which this solution may be most relevant.

## REFERENCES

- Stanford Byers Center for Biodesign. "Process." Stanford Byers Center for Biodesign, biodesign.stanford.edu/about-us/process.html.
- UpToDate. www.upToDate.com/contents/nocturnal-enuresis-in-children-management.
- Gomez Rincon M, Leslie SW, Lotollahzadeh S. Nocturnal Enuresis. [Updated 2021 Feb 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK545181/>
- [https://bedwettingstore.com/products/malem-ultimate-bedwetting-alarm?gclid=Cj0KCQw0K-HBhDDARIsAFj8UGheraPg0fargC-E5sNIS\\_1D754kqNmnmkqjPOb7cpgN1DXDKzcaud8EALw\\_wcB](https://bedwettingstore.com/products/malem-ultimate-bedwetting-alarm?gclid=Cj0KCQw0K-HBhDDARIsAFj8UGheraPg0fargC-E5sNIS_1D754kqNmnmkqjPOb7cpgN1DXDKzcaud8EALw_wcB)
- <https://www.verathon.com/bladderscan/>
- [https://www.healthproductsforyou.com/p-dfree-incontinence-alarm-device.html?utm\\_source=google&utm\\_medium=surfaces&utm\\_campaign=shopping%20feed&utm\\_content=free%20google%20shopping%20clicks&gclid=CjwKCAjw87SHBhBIEwAukSeUvwoUPa5\\_yNijS9BteG7K8xCjSP5Skv-Xr4j7g6oH6P99tYvVmX1x0CjTEQAvD\\_BwE](https://www.healthproductsforyou.com/p-dfree-incontinence-alarm-device.html?utm_source=google&utm_medium=surfaces&utm_campaign=shopping%20feed&utm_content=free%20google%20shopping%20clicks&gclid=CjwKCAjw87SHBhBIEwAukSeUvwoUPa5_yNijS9BteG7K8xCjSP5Skv-Xr4j7g6oH6P99tYvVmX1x0CjTEQAvD_BwE)
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5121741/>
- <https://www.futurelearn.com/info/courses/understanding-continance-promotion/0/steps/46068>

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