david_sheridan@promedixinc.com

PROMEDIX

SEPSIS

- Sepsis is the leading cause of inpatient mortality and most expensive condition treated in the US costing $24 billion/year[1]
- Improved early detection can save hospital systems up to $1million a year[2]
- Over 1.5 million people in the US acquire **sepsis** each year resulting in over 250,000 deaths[3]
- Mortality from sepsis increases 8% for every hour delay in treatment
- Up to 80% of sepsis deaths could be prevented with rapid diagnosis
- Fever is a common complaint to the emergency department: Detecting sepsis is challenging and therapeutic monitoring inpatient is insufficient
- Sepsis is the leading cause of hospital readmissions
- Sepsis identification and risk stratification rely on various clinical findings and laboratory tests
- EHR has the ability to use data to result in better identification of possible sepsis patients and decrease cost[4]
- Capillary refill is a key indicator of decreased end organ perfusion that is seen in sepsis
- Prolonged capillary refill after initial IV fluids ~6x higher mortality that patients with normal capillary refill after[5]
- Capillary refill is a very early indicator of improved end organ perfusion and resuscitation[6,7]
- Capillary refill guided resuscitation and withholding IV fluids in sepsis patients with normal capillary refill results in decreased end organ failure[8]
- A large Prospective RCT evaluated capillary refill compared to lactate levels in sepsis[9,10]
    - Resulted in **less organ dysfunction** at 72hrs
    - Resulted in **less mortality** at day 28 (34.9% vs 43.4%)
- Multiple trials show targeting capillary refill monitoring in sepsis works![5,9,10,11]
    - Patients normalizing capillary refill time after initial resuscitation mortality: 9-23%
    - Patients that don't show normalizing capillary refill time: 45-55%
- ICU treatment protocols with overall treatment strategy is to normalize capillary refill[12]
    - No current technology for capillary refill so relies on manual
- Capillary refill is a physical exam finding with HIGH variability based on provider performing test[13]

INPATIENT/HOME DECOMPENSATION

- 5% of emergency dept hospital admissions **decompensate** to require ICU admission with 24hrs and account of 25% of in hospital mortality[14]
- 10% of patients transferred out of the ICU to lower level care decompensation back to the ICU in critical condition[15]
- Patients deteriorating on the inpatient wards account of 24% of ICU admission, 22% of hospital deaths and 13% of all hospital days[16]
- 36% of ICU transfers from the general inpatient wards could be preventable[17]

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- Root cause analysis shows that up to 45% of ICU transfers were related to patient monitoring inadequacy[18]
- Early warning scores to identify deterioration are variable based on current standard vital signs with inadequate ability to specifically identify patients[19]
- Patients with delayed recognition of decompensation result in longer hospital stays by 1-2 days; The average inpatient daily cost in the US is $2,052[20.21]
- Consensus guidelines show that capillary refill and distal tissue perfusion assessment at the bedside is an important monitoring component[22,23]
- Capillary refill is an INDEPENDENT early predictor of mortality and morbidity for inpatient decompensation[24]
    - Patients with prolonged capillary refill time:
        - Twice as likely to die (36% v 17.8%)
        - Have longer hospital stay (15.3 days vs 13.5 days)
            - Could save approximately $5000/patient
        - Of 11 clinical predictor variables this was 2nd to only hypoxia

PROMEDIX

- We have a simple, noninvasive finger sensor for rapid and accurate measurement of capillary refill in less than 30 seconds
    - Any level of provider can get the same measurement without variability
- Promedix developed signal processing algorithms to analyze and give data in real time to providers
- Platform includes a fully built out application that processes data from the sensor via BLE
- Platform can be integrated with existing medical monitors and into the EHR to combine with other EMR data to assist in early sepsis detection in the ER and inpatient settings
- Sensor would not impact workflow significantly
- It can be used in the home market as we healthcare moves more to home hospitalizations and monitoring to give early evidence of patient deterioration at home where providers may not be readily available
- 94% of surveyed physicians believe this would be a standard vital sign if obtained with a device at the bedside
- The total market opportunity is $303 million dollars by integrated this technology to a current medical monitor
- Many companies and researchers increasing interest in capillary refill/distal tissue perfusion monitoring at the bedside
- Platforms with sensors and accompanying app IP filing is showing exponential increases over the past 4 years.

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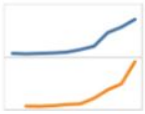
Publish/Grant Date

Technology area	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Grand Total
Wearable Sensors	3	1		5	9	21	37	101	127	164	468
Health (CRT) Apps		2	1	4	10	13	40	81	109	216	476
Grand Total	3	3	1	9	19	34	77	182	236	380	944



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