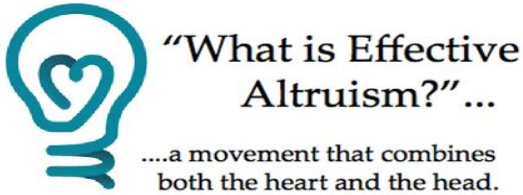
# Harvard University Effective Altruism Student Group
# Philanthropy Advisory Fellowship
# January 31, 2019

## Opioid Epidemic Intervention Research
## Final Report
## Prepared on behalf of the Laura & John Arnold Foundation

Harvard University
Effective Altruism
Student Group

# Principles of Effective Altruism

- **Maximization**: Do the most good you can do
- **Rationality**: Base decisions on evidence & reason
- **Cosmopolitanism**: Value all lives equally
- **Cost-Effectiveness**: Try to quantify impact and optimize scarce resources
- **Scope-Sensitivity**: Focus on the biggest problems -- think about how many lives are affected
- **Cause Prioritization**: Choose cause areas strategically instead of favoring pet causes
- **Counterfactual Reasoning**: Ask what would happen otherwise -- consider indirect effects




**Other Effective Altruism Organizations**

CENTRE FOR EFFECTIVE ALTRUISM

GiveWell

THE LIFE YOU CAN SAVE

Open Philanthropy Project

# Philanthropy Advisory Fellowship

The **Philanthropy Advisory Fellowship** is a student-run program organized by the **Harvard University Effective Altruism** Student Group

We recruit and train **graduate students** to advise philanthropists, foundations, and corporations on how to achieve the **greatest impact** with their charitable activities.

Our Fellowship is:

- **Multi-Disciplinary**: Teams combine students from HKS, HBS, HSPH, HLS, GSAS, etc.
- **Educational**: The program includes charity evaluation trainings, student mentorship, and faculty advisors
- **Experienced**: Past clients include YouTube, Draper Richards Kaplan Foundation, TripAdvisor Foundation, Laura & John Arnold Foundation

Harvard University Effective Altruism Student Group

Philanthropy Advisory Fellowship

# Evaluation and Ranking Criteria

For evaluation of each intervention, we use following criteria:

- **Evidence:**
  - What is the quantity and quality of evidence supporting the intervention?
- **Cost-Effectiveness:**
  - Benefits to society, e.g. decreased healthcare costs, statistical value of life, crime reduction, improved productivity, (measured in dollars) divided by program cost
- **Scalability:**
  - How many people could potentially benefit from a scale up of the intervention?

| Area | A | B | C | F | N/A | Preferred Source | Backup Source |
|---|---|---|---|---|---|---|---|
| *Evidence* | 3 or more high-quality RCT's [Knock down if extrapolating from alcohol] | 1-2 RCT's or multiple sources of quasi-experimental evidence | Evidence is weak but we still find it convincing | Not enough evidence | Didn't examine | Phillips 2017, Cochrane Reviews | PAF Literature Review from PubMed search |
| *Cost-Benefit* | >10x | 3-9x | 1-2x | <1x | Not enough evidence | WSIPP 2017 | PAF Fermi estimation |
| *Scalability* | 100,000's | 10,000's | 1,000's | <1,000 | Not enough evidence | PAF Fermi estimation | |

# 25 Experts Interviewed

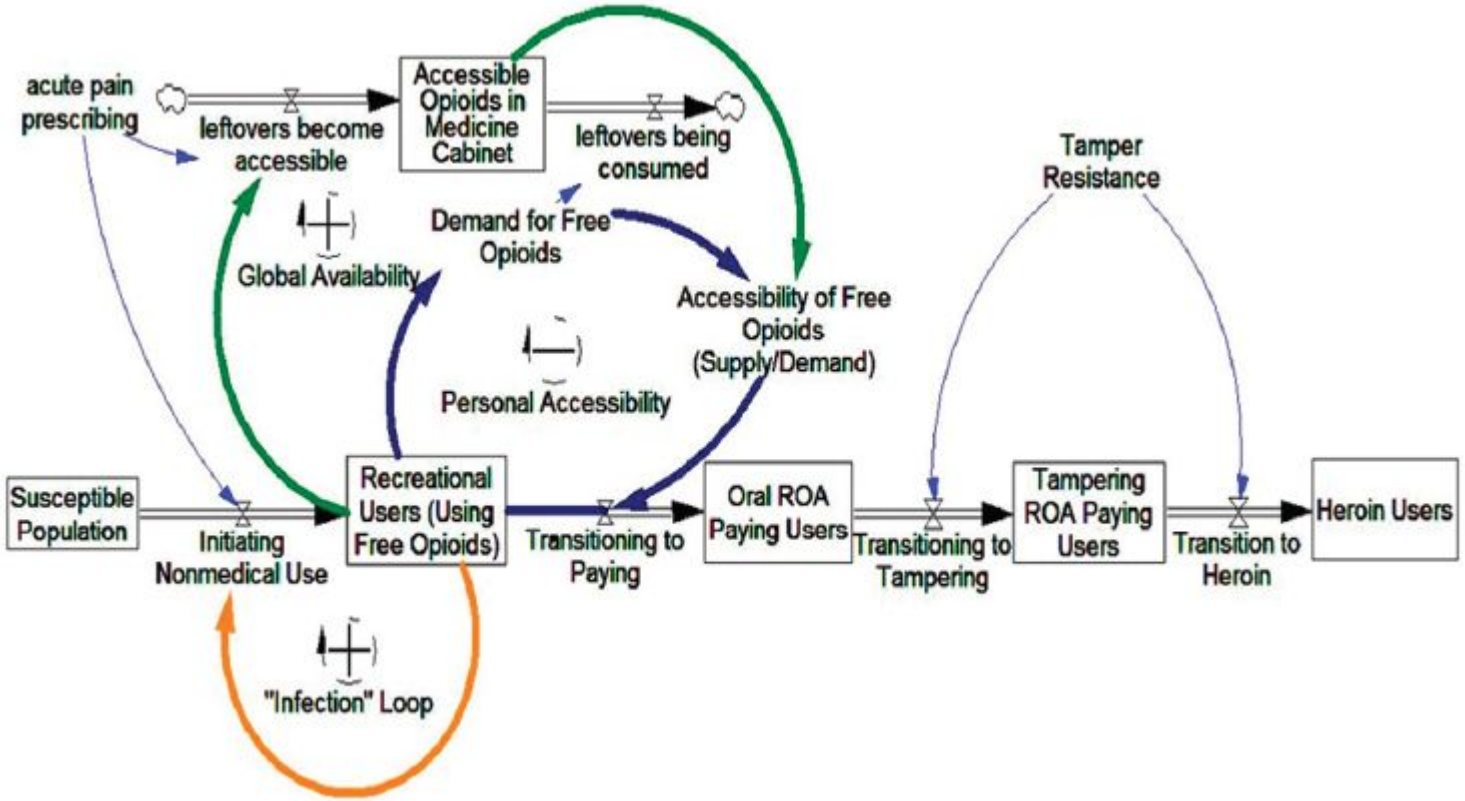
| | |
|---|---|
| Marc Dones | Futures Laboratories |
| Vaughan Rees | HSPH/ Center for Global Tobacco Control |
| Elizabeth Powell | MGH SUD Initiative |
| Michelle Putnam | CDC |
| Launette Rieb | University of British Columbia |
| Shelly F. Greenfield | HMS / McLean Hosptial |
| Roger D. Weiss | HMS / McLean Hosptial |
| Peter Butt | University of Saskatchewan / Saskatoon City Hospital |
| Colleen L. Barry | John Hopkins School of Public Health |
| David Gastfriend | DynamiCare Health |
| David Lewis | Drug Policy Alliance |
| Nicole Dueffert | Truth Initiative, "The Truth About Opioids" |

| | |
|---|---|
| Anne Boffa | Harvard Pilgrim |
| Daniel Liebman | HMS/HBS Student |
| Mark Shankar | HBS Student/MD with Emergency Dept experience |
| Leemore Dafny | HBS Professor |
| Mitchell Weiss | HBS Professor |
| Annie Rittgers | Founder, 17a Consultancy working on opioids |
| Dr. Shiu-Lin Tsai | Integrative Care MD, Columbia |
| Dr. Darshan Mehta | HMS Osher Center for Integrative Medicine |
| Ramon Bataller | UNC Chapel Hill / U Pittsburgh |
| Mark O'Brien | Addiction Policy Forum |
| Bennett Sobel | Oxeon Ventures |
| Fred Meunch | Partnership for Drug Free Kids |
| Patricia Conrod | Preventure |

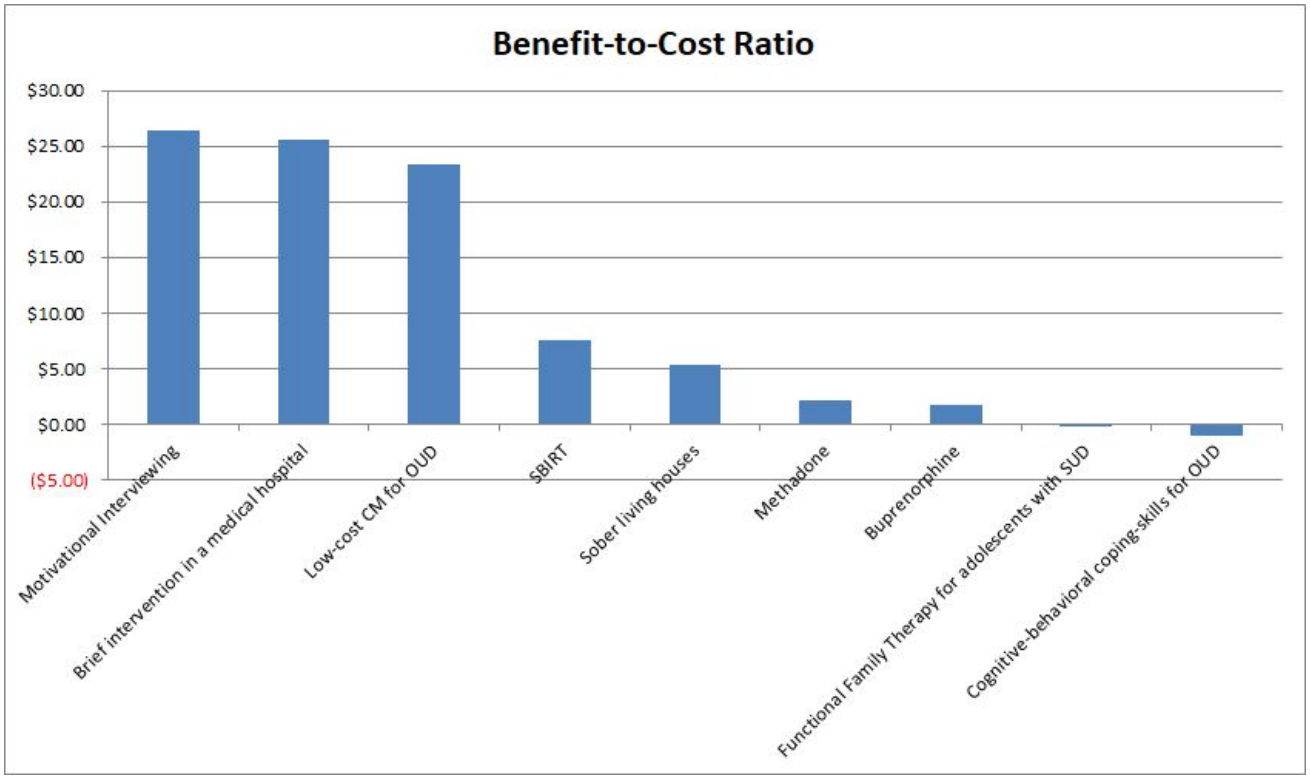
# 9 Key Reports Reviewed

| First Author (Last Name) | Year | Title |
|---|---|---|
| Phillips | 2017 | Pain Management and the Opioid Epidemic: Balancing Societal and Individual Benefits and Risks of Prescription Opioid Use |
| WSIPP | 2018 | Washington State Institute for Public Policy Benefit-Cost Results: Substance Use |
| WH Council of Economic Advisors | 2017 | The Underestimated Cost of the Opioid Crisis |
| Pitt | 2018 | Modeling Health Benefits and Harms of Public Policy Responses to the US Opioid Epidemic |
| Tick | 2017 | Comparison of Non-pharma techniques |
| Ruhm | 2018 | Deaths of Despair or Drug Problems? |
| McKinsey & Co. | 2018 | Why we need bolder action to combat the opioid epidemic |
| Degenhardt | 2014 | The global epidemiology and burden of opioid dependence: results from the global burden of disease 2010 study |
| SAMHSA | 2018 | National Survey on Drug Use and Health (NSDUH) |

# Simplified Model of Opioid Ecosystem (Rec #1)



# Example of Cost-Effectiveness Analysis



# WSIPP Methodology

Pros:

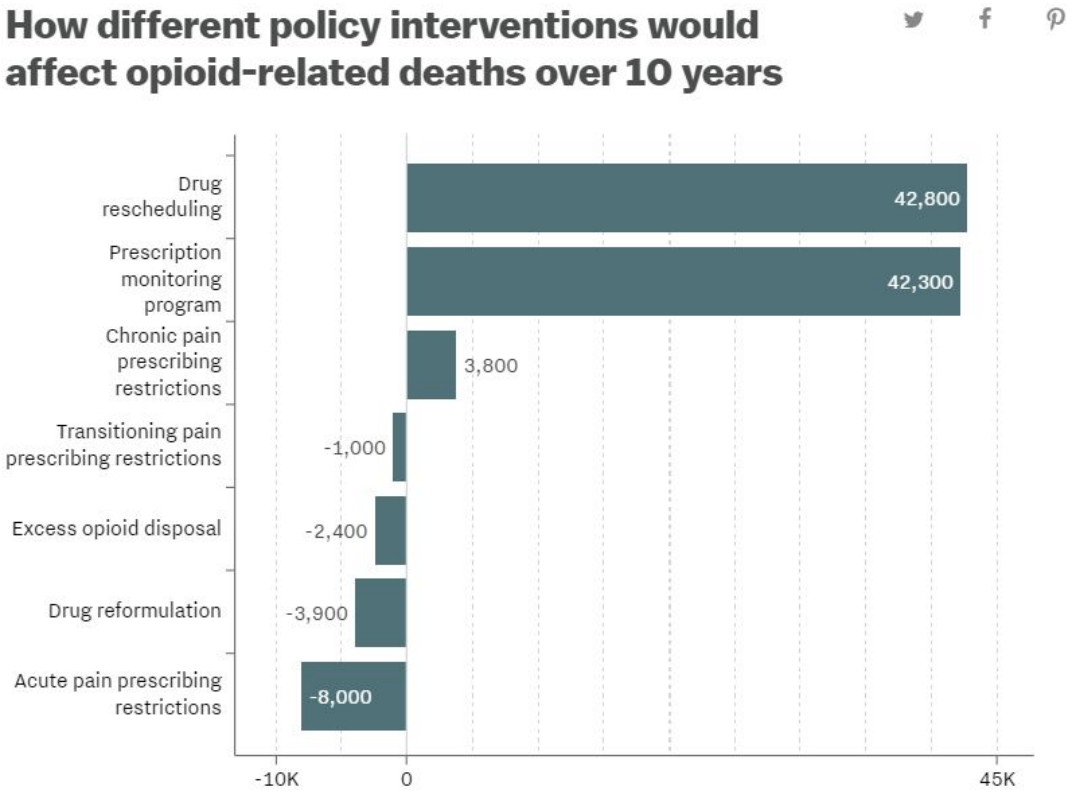
- Evidence-based, but flexible on rigor
  - RCT's are weighted more heavily but other types of evaluations are also included
- Rigorous, peer-reviewed cost-benefit methodology
  - Systematic literature search
  - Meta-analytic techniques to aggregate effect sizes
  - Monetization of effect sizes, delay discounting
  - Thorough; includes deadweight loss from taxation
  - Risk estimation
- Unbiased, neutral 3rd-party
- Comparability; standardized methodology across many interventions

# WSIPP Methodology

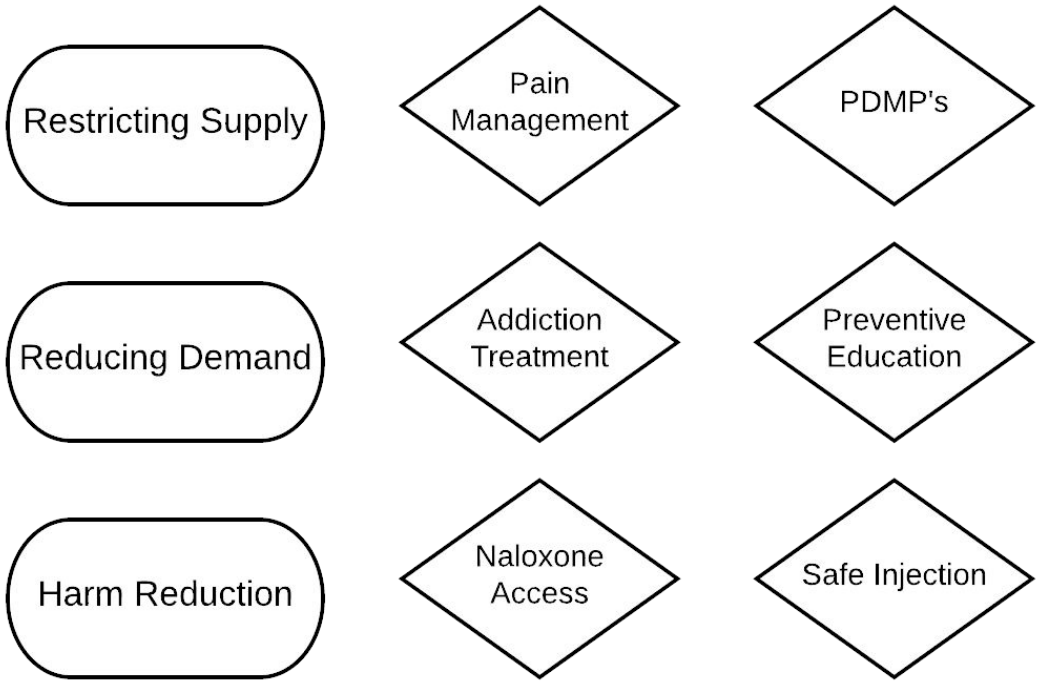
Cons:

- Opaque
  - Individual studies are cited but quality of evidence is unclear, individual study findings not explained
  - Unclear economic weightings for effect sizes
  - Cost estimates not fully explained
  - Benefits are categorized into broad categories
- Relies on multiple levels of linked estimates rather than real-world data
- Metric: economic multiplier instead of cost-per-outcome

# Example of Model-Based Scalability Analysis



## High-Level Overview of Possible Strategies for Opioid Epidemic



| Interventions: Pain Treatment | *Evidence* | *Cost-Effectiveness* | *Scalability* |
|---|---|---|---|
| Injection therapy for chronic back pain | C | B | A |
| PT for chronic back pain | B | B | A |
| CBT for chronic back/neck pain | B | B | A |
| **Chiropractic manipulation for chronic back pain (Recommended)** | B | A | A |
| **Acupuncture for chronic back pain (Recommended)** | B | A | A |
| Acupuncture for acute back pain | C | A | A |
| **Exercise therapy for chronic back pain (Recommended)** | B | A | A |

| Interventions: Opioid Supply | *Evidence* | *Cost-Effectiveness* | *Scalability* |
|---|---|---|---|
| TeleECHO for Chronic Pain Medicine | C | B | A |
| **Opioids safe prescribing training during medical school (Recommended)** | C | A | A |
| Academic Detailing | C | B | C |
| Drug takeback programs (excess medication disposal) | B | A | B |
| Prescription Drug Monitoring Programs (PDMPs) | F | ? | A |

# Interventions: Addiction Treatment

| *Intervention* | *Evidence* | *Cost-Effectiveness* | *Scalability* |
|---|---|---|---|
| Buprenorphrine | A | B/C | A |
| Methadone | A | B/C | A/B |
| Vivitrol (Injectable Naltrexone) | A | C/F | A |
| **Computerized CBT (Recommended)** | B | A | A |
| **Contingency Management (CM) (Recommended)** | A | A | A |
| Repeated dose motivational interviewing | B | ? | C |
| Research on Psychedelics | C | A | A |
| Project Extension for Community Healthcare Outcomes | C | A | A |

## Interventions: Access / Referral to Treatment

| *Intervention* | *Evidence* | *Cost-Effectiveness* | *Scalability* |
|---|---|---|---|
| Insurance coverage parity | A | C | B |
| SBIRT (Screening, brief intervention, referral to treatment) | C | B | C |
| **Inpatient Addiction Consult Teams (Recommended)** | B | A | C |
| **ER post-overdose referral to care (Recommended)** | B | B | A |
| **Level-of-Care Treatment Matching (Recommended)** | C | A | B |

# Interventions: Harm Reduction

| *Intervention* | *Evidence* | *Cost-Effectiveness* | *Scalability* |
|---|---|---|---|
| Naloxone distribution | C | B | A- |
| **Drug Checking (Recommended)** | C | **A** | **A** |
| Supervised Injection Heroin | C | N/A | F |
| Naloxone Access Laws | C | C | **A** |

# Interventions: Prevention / Education

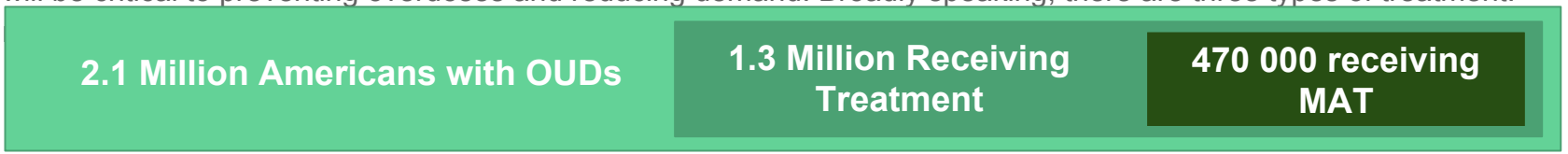
| *Intervention* | *Evidence* | *Cost-Effectiveness* | *Scalability* |
|---|---|---|---|
| DARE - Keepin' It Real | B | C | A |
| Prosper | A | C | A |
| **Preventure (Recommended)** | B | B | A |
| BASICs | B | A | B |
| Teen Intervene | B | B | B |
| CRAFT | B | B | A |
| Digital Storytelling | C | ? | B |

# Other Recommendations

| Title | Brief Description |
| --- | --- |
| Develop a formal model of the opioid ecosystem | It would be possible to bring together a team of researchers to develop a formal quantitative model of the opioid ecosystem (from prescribing, to diversion, recreational use, addiction, and overdose) which would be useful for philanthropists and policymakers to predict the effects of policy changes and programs on opioid use (Phillips 2017). |
| Fund WSIPP to publish more of their internal model | WSIPP has the most comprehensive cost-benefit analysis of SUD interventions, and it is also quite rigorous, but unfortunately quite opaque. WSIPP has limited staff to dedicate to updating its website because it was not a priority of its primary funder (the Washington State Legislature), but could publish more of its model if it had more resources. This would help not only LJAF make more informed funding decisions, but also likely influence other philanthropic and governmental donors in the space. |
| Deepen and broaden the intervention search | Further philanthropic strategy research should be continued in this area to build more rigorous cost-effectiveness models (especially those not covered by WSIPP) and should be broadened to include other cause areas such as policy changes and work in criminal justice, for comparability. |

# Focus Area #1: Addiction Treatment

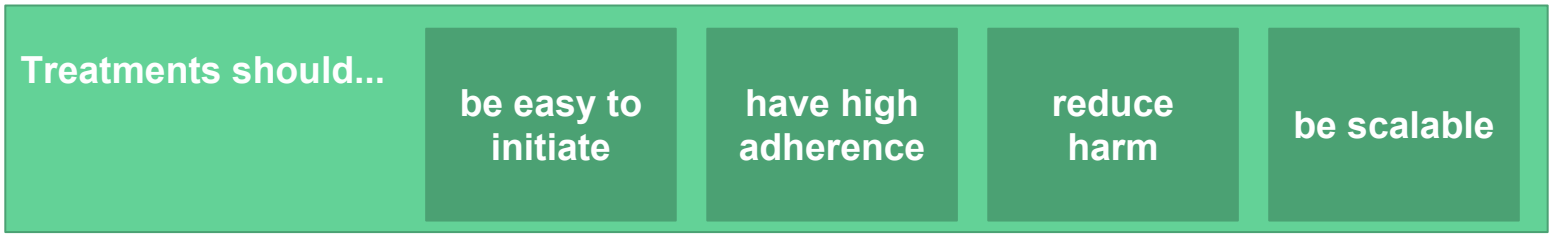
*Overview*: Addiction is treatable - connecting individuals with opioid use disorders (OUDs) to the most effective treatments will be critical to preventing overdoses and reducing demand. Broadly speaking, there are three types of treatment:




2017 National Survey of Substance Abuse Treatment Services and 2017 National Survey on Drug Use and Health

*Key Experts*:

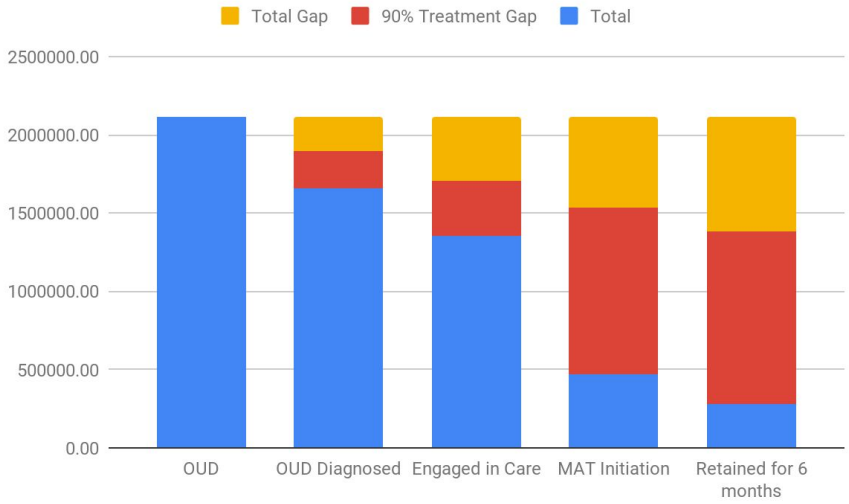
- Dr. Launnette Rieb, University of British Columbia
- Dr. David R. Gastfriend, Treatment Research Institute



# Addiction Treatment - Problem Spotlight: MAT Retention

*Overview*: After being initiated on MAT, many individuals are unable to adhere to the treatment, which increases the likelihood of relapse, overdose, and often increases healthcare costs

- Retention is reported to be around 40-60%, but there is a lot of variability
- Generally, methadone has been shown to have higher retention than buprenorphine (but has more adverse outcomes too)
- The variability suggests that there may be external factors (i.e. delivery methods or patient characteristics) that make some treatments easier to adhere to




**2017 Cascade of Care from Opioid Use Disorder to Medication Assisted Treatment (See data here)**

*Est. # of people affected annually:* ~250,000 start but do not adhere to MAT

*Key Report/Study*:
Cochrane Systematic Review: Opioid agonist treatment for pharmaceutical opioid dependent people

# Addiction Treatment - Recommendation: Computerized CBT

*Overview*:

- Computerized CBT teaches a variety of CBT skills that are specific for helping people to reduce substance abuse via an app or website
- CBT4CBT is an example of computerized CBT

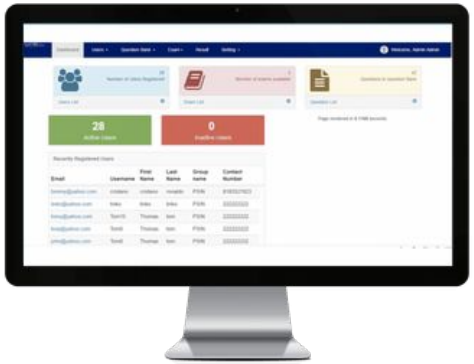
*Evaluation:*

**Effect size:** Computerized CBT led to 19% more individuals having negative urine samples after 6 month follow up when compared to those receiving in person therapy at a clinic (RCT available here)

**Quality of evidence:** Only 2 RCTs

**Cost-effectiveness estimate**: $1052 per one individual put into remission: ~$200 (cost of CBT4CBT) x 5.3 Number Needed to Treat. If the cost of an OUD is $250,000, then x237 cost effectiveness ratio

**Scalability**: Computerized CBT is relatively new, so not widely scaled. CBT is already widely used, so minimal cultural shift. Requires internet connection.



**Evidence: B** (2 RCTs)

**Cost Benefit: A** (x237)

**Scalability: A**

# Addiction Treatment - Recommendation: Contingency Management

*Overview*:

- Contingency management (CM) involves giving patients tangible rewards to reinforce positive behaviors
- Can be used to incentivise abstinence and/or adhering to treatment
- In *Voucher-Based Reinforcement*, the patient receives a voucher for every drug-free urine sample provided, which can be exchanged for goods or services that are consistent with a drug-free lifestyle (food, movie passes, etc.)
- In *Prize Incentives Contingency Management,* participants supplying drug-negative urine or breath tests draw from a bowl for the chance to win a prize.

*Evaluation (from WSIPP):*

**Benefit-Cost Summary Statistics Per Participant**

Benefits to:

| | | | |
|---|---|---|---|
| Taxpayers | $1,755 | Benefits minus costs | $19,989 |
| Participants | $2,499 | Benefit to cost ratio | $35.41 |
| Others | $708 | Chance the program will produce benefits greater than the costs | 77 % |
| Indirect | $15,607 | | |
| Total benefits | $20,570 | | |
| Net program cost | ($581) | | |
| Benefits minus cost | $19,989 | | |

**Evidence:** A (22 RCTs)

**Cost Benefit:** A (x35)

**Scalability:** A

# Addiction Treatment - Intervention Spotlight: Buprenorphine

*Overview*:

- Buprenorphine is a **partial opioid agonist-antagonist**
  - **Full opioid agonists**, such as heroin and oxycodone, stimulate opioid receptors much more and cause a larger high
  - **Full opioid antagonists**, such as naloxone or naltrexone, block the opioid receptors altogether
- Safe substitute for illicit opioids; effect levels off at high doses
- It is often dosed with naloxone under the brand name suboxone in order to discourage abuse via injection


*Evaluation:*

**Effect size:** Buprenorphine led to 19% more individuals having negative urine samples after ~24 weeks when compared to placebo (RCT available here).
**Quality of evidence:** very strong; multiple large-scale RCTs; meta-analyses
**Cost-effectiveness estimate**: $15,900 per one individual put into remission: $6,000/pt./yr (NIDA 2018) x 0.5 yr x 5.3 Number Needed to Treat)
**Scalability**:1.5 Million Americans have OUDs, but not receiving MAT

**Evidence:** A (20 RCTs)

**Cost Benefit:** C (x1.75)

**Scalability:** A (1.5 million)

Systematic Review available here
Cost-Benefit Analysis from WSIPP

# Addiction Treatment - Intervention Spotlight: Methadone


*Overview*:

- Methadone is a **full opioid agonist**
- Unlike buprenorphine, the effects of methadone do not level off at high doses, which can make it a better choice for long-time opioid users
- Methadone is associated with more adverse events than buprenorphine
- Can only be dispensed from licensed methadone clinics and politically unpopular

*Evaluation:*

**Effect size:** Methadone led to 20% more individuals having negative urine samples after ~16 weeks when compared to placebo (RCT available here).
**Quality of evidence:** very strong; multiple large-scale RCTs; meta-analyses
**Cost-effectiveness estimate**: $16,250 per one individual put into remission: $6,500 /pt./yr (NIDA 2018) x 0.5 yr x 5 Number Needed to Treat)
**Scalability**:1.5 Million Americans have OUDs, but not receiving MAT

Systematic Review available here
Cost-Benefit Analysis from WSIPP

**Evidence:** A (11 RCTs)

**Cost Benefit:** C (x2.19)

**Scalability:** B (1.5 million, but highly regulated)

# Harm Reduction | Recommendation: Drug Checking (Fentanyl Testing Strips)

## Evidence

John Hopkins study (242 heroin-user subjects): 29% tested positive for fentanyl, 73% reported not knowingly using fentanyl

Brown survey (81 young adult drug-user subjects): 95% report wanting to use fentanyl test strips in the future

Further need for high-quality trials (0 RCTs found)

**Grade: C**

Sources: John Hopkins Study, Brown Survey

## Cost Benefit

$1-2 single-use strip cost, online

RTI Int'l study of benefits (125 subjects): 43% reported a change in drug use behavior, 77% reported an increase in perceived overdose safety (conceivable to reduce OD)

$25k cost per overdose avoided vs. $250k value of prevention: $100 cost/year / [10% of tests positive * 40% do not take the drug * 10% chance of OD]
**Grade: B (10x)**

Sources: DanceSafe, RTI Int'l Study, Wake Forest study
Societal cost of OUD is $500B for 2.5M people, $250K per OUD (WH Council of Econ. Advisors 2017)

## Scalability

2M American adults have OUD and could use strips (2x/wk)

Opportunity to scale leveraging health care system, non-profits; shipping reaches rural areas

SF test strip pilot demonstrates ability to combine with syringe and naloxone programs

Classified as drug paraphernalia, so need to re-classify; not FDA-approved (low risk to scaling)
**Grade: A**

Sources: BTNX, DrugPolicy.org

# Intervention Spotlight 2: Harm Reduction Intervention Programs -- BASICS

## Evidence

Brief Alcohol Screening and Intervention of College Students (BASICs) facilitates interventions for young people.

18 RCTs*; average effect size was -0.166 for alcohol consumption

**Grade: B**

*Source: Efficacy of brief alcohol screening intervention for college students (BASICS): a meta-analysis of randomized controlled trials.

## Cost Benefit

According to the Washington State Institute for Public Policy, the program costs $72/participant and generates $1,267 in benefit.

Overall, the program provides $1,194 in benefit.

**Grade: A**

## Scalability

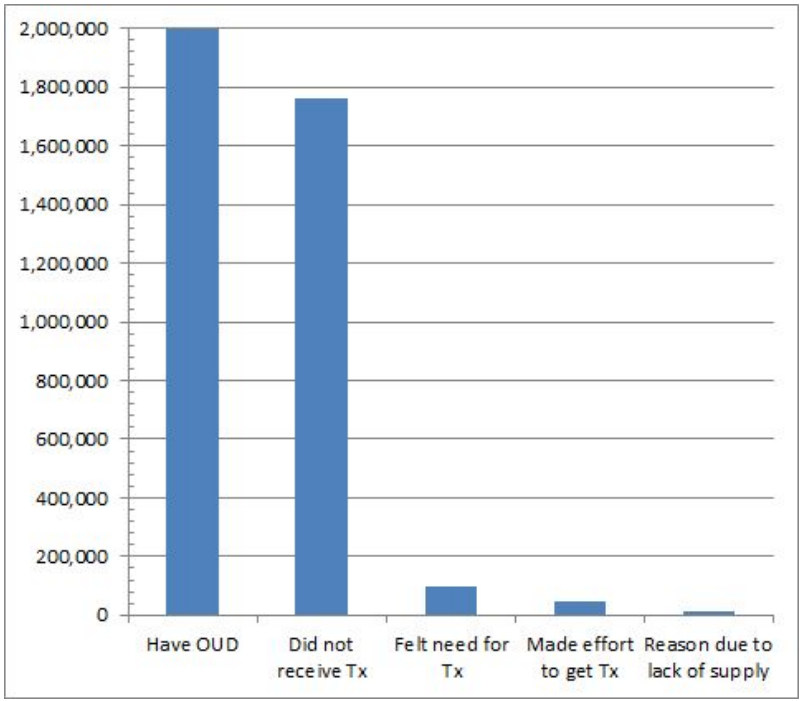
Program is proven to be effective for college-aged individuals (18-24); it has not been tested on the general population so overall effectiveness remains unclear.

However, the program is able to be purchased from university to university so is scalable within that context.

**Grade: B**

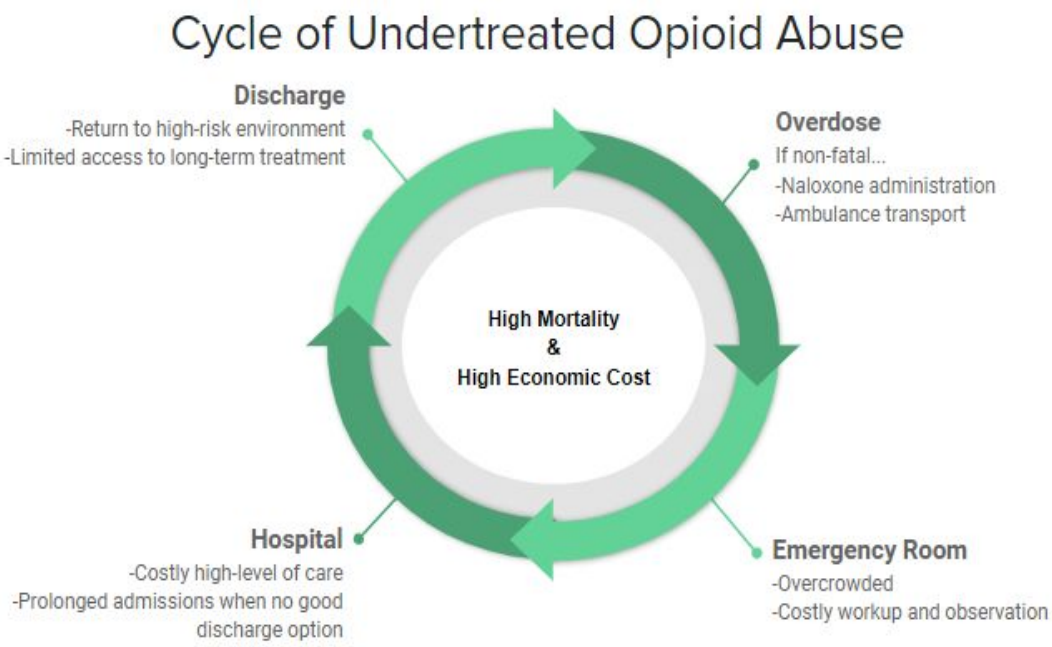
# Access to Care | Problem Spotlight - Treatment Supply & Demand

*Overview*:
It is important to determine whether access to care can be better addressed by increasing the supply of treatment (spots in programs) or by increasing demand (e.g. making more referrals). There are many instances of patients not being able to find open spots in programs or having to wait on waitlists to get into treatment, which often discourages seeking treatment altogether. We researched this quantitatively using national survey data on SUD.
Among 2M people with OUD, 88% do not receive treatment. Of those 88%, only 2.7% felt the need and made effort to get treatment. Among that 2.7%, the most common barriers cited were costs and that people were not ready to stop using substances. Reasons related to lack of supply accounted for at most 1/3 of answers.
*# affected:* ~16,000 may annually seek OUD treatment yet not receive it due to lack of supply.
*Key Report/Study*: National Survey on Drug Use and Health (NSDUH) 2017 data on SUD (not specific to OUD)



# Focus Area #2: Referral to Care | Problem Spotlight - Post-overdose ED Care

*Overview*: Emergency department (ED) visits for opioid overdose increased by nearly 30% across age groups in most states 2016-2017 (Vivolo-Kantor 2018). While the efficacy of improving access to treatment services for opioid use disorder (OUD) has been established, most health systems have not yet developed the referral infrastructure to coordinate long-term care




*Est. # of people affected annually:*
~40,000 (based on 142,000 ED visits)

*Key Experts*:

- Michelle Putnam
  Centers for Disease Control
- Elizabeth Powell
  MGH Substance Use Disorders Initiative

# Referral to Care | Recommendation: ED-initiated SBIRT

## Evidence

3 RCTs

Associated with reduced rates of substance use as soon as 3 months and >50% in 1 year

Screening alone associated with decreased opioid use

Initiating MAT in ED amplifies effectiveness of SBIRT: up to 78% of patients subsequently enroll in addiction treatment

**Grade: B**

Sources: JAMA Decreased Opioid Use Study, JAMA MAT Study

## Cost Benefit

$442 cost per patient screened

Investing in SBIRT can yield health care cost savings of $5.60 for each dollar spent

Break even in roughly 2 years

Can reduce ED utilization and number of expensive ED visits

Benefit-to-cost ratio estimated $7.56 by WSIPP

**Grade: B**

Sources: WSIPP

## Scalability

92,000 ED visits for nonfatal opioid overdoses per year

Opioid overdose rates increasing in five U.S. regions and across demographic groups

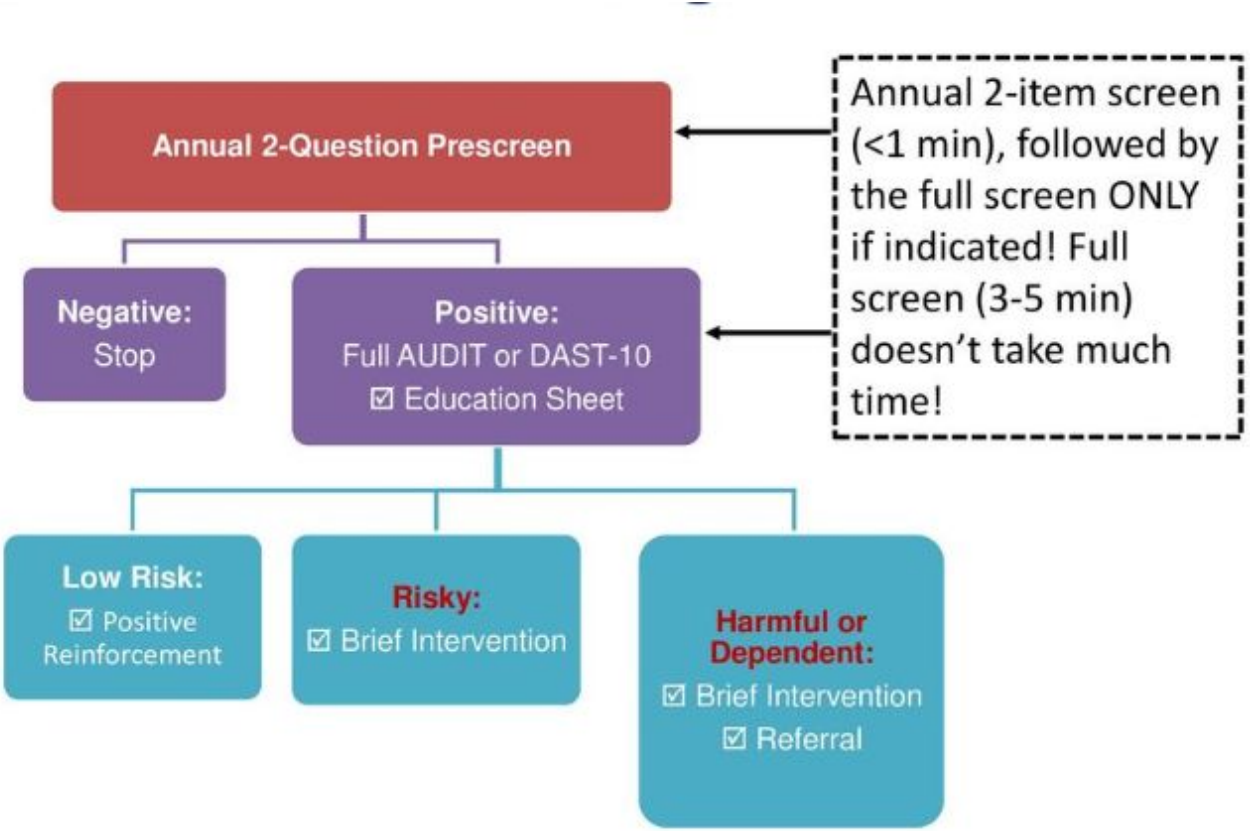
Scaling requires training providers in SBIRT and hiring staff to facilitate referral

Online SBIRT curricula can expedite training process

**Grade: A**

Sources: Opioid Overdose Rates, Online SBIRT Training Study

# Referral to Care | Recommendation - ED-initiated SBIRT



# Referral to Care | Problem Spotlight - Hospital Discharge

*Overview*:

Substance use disorder (SUD) is more prevalent among
are vulnerable at hospital discharge, when the risks of ov
improve clinical outcomes have been validated but have

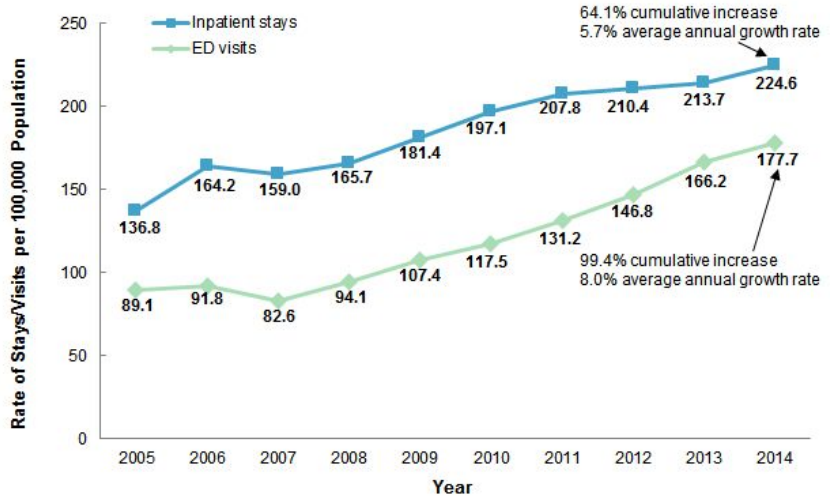
- 6% of patients with an SUD were referred for addi
  referred for any treatment
- Discharge planning could include referral to intens
  harm reduction resources

*# affected:* ~500,000 patients were diagnosed with OUD

*Key Report/Study*:

Substance Abuse and Mental Health Services Administra
United States

**Figure 1. National rate of opioid-related inpatient stays and emergency department visits, 2005-2014**



# Referral to Care | Recommendation - Inpatient Addiction Consult Teams

| Evidence | Cost Benefit | Scalability |
| --- | --- | --- |
| 82% of patients with OUD engaged in post-discharge addiction follow-up visit<br><br>Decrease in:<br>1) past-30-day overdose<br>2) hospital readmission (61% vs. 51%)<br>3) substance-related ED visits (66% vs. 53%)<br><br>Roughly 20-30% of patients can expect to remain in remission<br><br>**Grade: B** | Requires high labor costs to staff physician, pharmacist, social worker, nurse<br><br>Cost of each remission estimated at $4,027 - $6,624 by PAF<br><br>Longer-term savings in ED utilization and readmission rates will likely cover short-term costs<br><br>**Grade: A** | Limited to hospitals with addiction specialists (1,200 nationwide)<br><br>Consult services can operate effectively with part-time staffing<br><br>Members of ACTs can presumably serve additional roles in hospital<br><br>May need affiliation with outpatient addiction clinic<br><br>**Grade: C** |
| Sources: MGH SUD Study, BMC Study | Sources: PAF Fermi Estimate | Sources: WP - Addiction Specialists |

# Referral to Care | Recommendation - Level-of-care Treatment Matching

## Evidence

Undermatched OUD patients 3x less likely to continue treatment

Shown to be effective in reducing use for other substances, especially alcohol

Can reduce excessive hospital utilization

1 ongoing RCT for OUD patients

**Grade: C**

Sources: ASAM Criteria, Hospital Utilization Study

## Cost Benefit

Matching patients unlikely to require additional staff - cost estimated at $1,000 per patient

Cost per remission estimated at $8,333 by PAF

Reduced no-show rates can improve adherence to MAT and yield additional savings for the healthcare system

**Grade: A**

Sources: PAF Fermi Estimate

## Scalability

ASAM has developed patient placement criteria that is recognized by most states

Reliably implemented with low interrater variability

Matching algorithm can be computerized to facilitate use

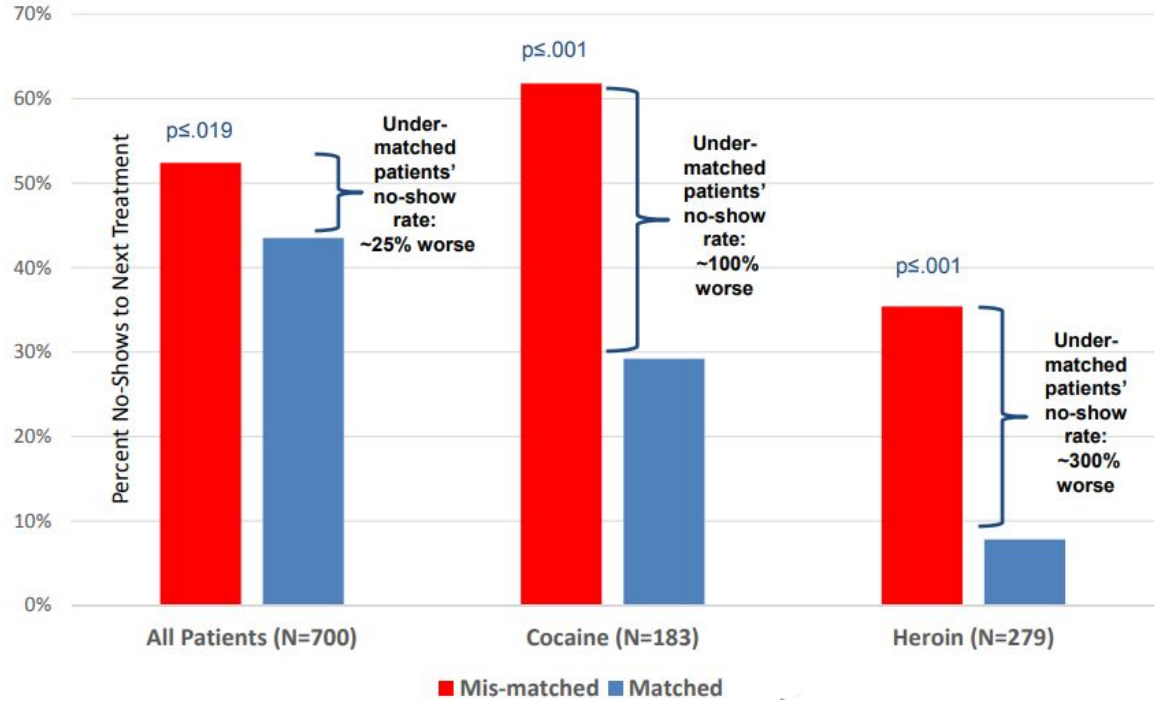
Limited to patients previously diagnosed with OUD

**Grade: B**

Sources: ASAM Criteria, Computerized Algorithm

# Under-Matching Worsens No-Show to Treatment

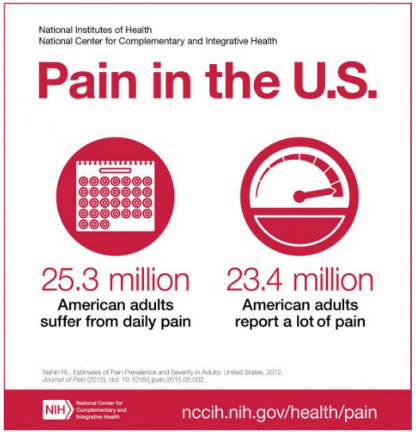
From Inpatient Detox to Either Residential Rehab or Day Treatment:
All Patients, High Frequency Cocaine Users and Heroin Users



# Focus Area #3: Integrative Medicine | Problem Spotlight - Chronic Pain

*Problem Overview*: An estimated 126M/56% of American adults experience some type of pain, of which **25M/11% suffer from daily pain**.*

- 21-29% of patients prescribed opioids for chronic pain misuse them**
- **8-12% develop an opioid use disorder****




*Cause Area Overview*: Integrative Medicine represents the opportunity to treat people with chronic pain without opioids. Integrative techniques include***:

**Non-Addictive Pharma**

- Steroids
- Muscle Relaxants
- Non-steroidal anti-inflammatory drugs (NSAIDs)

**Non-Pharma Therapy**

- Physical therapy (PT)
- Cognitive behavioral therapy (CBT)
- Spinal stimulation/nerve injections

**Complementary and alternative medicine (CAM)**

- Osteopathic/chiropractic manipulation
- Acupuncture
- Stress reduction (yoga, exercise, meditation)
- Biofeedback
- Medical marijuana

*Source: NIH
**Source: NIDA
***Source: Cochrane

# Integrative Medicine | Recommendation: Exercise Therapy for Chronic Back Pain

## Evidence

Cochrane meta-analysis of 61 RCTs: 6,390 subjects

Slightly effective at reducing pain and improving function, compared to standard treatment

Further need for comparative trials that measure efficacy compared to opioids and other integrative medicine treatments

**Grade: B**

Source: Cochrane Meta-Analysis

## Cost Benefit

$15 cost per yoga or other fitness class, or $300 cost for 20* classes (duration assumed to realize slight pain reduction; *plus free at-home yoga/fitness)

Benefit up to 8M people (of 25M with daily pain, assuming 32% reduce opioid use in line with acupuncture study). Of 8M, 800k (10%) avoid an OUD at $9.5k, vs. $250k value of prevention

**Grade: A (26x)**

Sources: Wake Forest Study; Societal cost of OUD is $500B for 2.5M people, $250K per OUD (WH Council of Econ. Advisors 2017)

## Scalability

25M American adults with daily pain could do free at-home fitness with positive side effects

Insurance programs and employers are increasingly offering wellness incentive programs and/or gym membership reimbursements

Expectation-setting and behavior changes likely required to realize benefits and positive side effects

**Grade: A**

Sources: Cigna Health

# Integrative Medicine | Recommendation: Chiropractic for Chronic Back Pain

## Evidence

Cochrane meta-analysis of 26 RCTs: 6,070 subjects

As effective as other common therapies for the treatment of chronic low back pain (insufficient evidence to compare to sham treatment). No complications found

Two-thirds of studies had high risk of bias, assume 8-9 sound RCTs

**Grade: B**

Source: Cochrane Meta-Analysis

## Cost Benefit

$65 cost per routine visit, or $650 cost for 10 sessions (duration matched to acupuncture)

Benefits include pain reduction and better function (short term)

Benefit up to 8M people (of 25M with daily pain, assuming 32% reduce opioid use in line with acupuncture study). Of 8M, 800k (10%) avoid an OUD at $20.5k, vs. $250k value of prevention

**Grade: A (12x)**

Sources: Wake Forest Study: Societal cost of OUD is $500B for 2.5M people, $250K per OUD (WH Council of Econ. Advisors 2017)

## Scalability

An estimated 70k licensed chiropractors (assume 48k active)

Assuming 1k patients per chiropractor, there is current supply for 48M patients (vs. 35M annual users)

Of the 13M person over-supply currently available, 8M could be treated instead of using opioids

**Grade: A**

Sources: ACA

# Integrative Medicine | Recommendation: Acupuncture for Chronic Back Pain

## Evidence

Cochrane: Meta-analysis of 35 RCTs: 2,861 subjects

More effective for pain relief and function than no treatment and sham treatment (immediately after treatment / short term only)

No more effective than other conventional and “alternative” treatments

Further need for high-quality trials

**Grade: B**

Source: Cochrane Meta-Analysis

## Cost Benefit

$75 cost per routine visit, or $750 cost for 10 sessions (duration recommended for chronic pain)

Benefits include pain reduction and better function (up to 1 year)

Benefit up to 8M people (of 25M with daily pain, assuming 32% reduce opioid use after receiving acupuncture). Of those 8M, 800k (10%) avoid OUD at $23.5k, vs. $250k value of prevention

**Grade: A (11x)**

Sources: VeryWellHealth, Wake Forest study
Societal cost of OUD is $500B for 2.5M people, $250K per OUD (WH Council of Econ. Advisors 2017)

## Scalability

An estimated 28k licensed acupuncturists (assume 18k active), though most are located in CA and NY

Assuming 1k patients per acupuncturist, there is current supply for 18M patients (vs. 3M actual users in recent 1 year)

Of the 15M person over-supply currently available, 8M could be treated instead of using opioids

**Grade: A**

Sources: NHIS Survey, Acupuncture

# Prevention | Recommendation: Safe-Prescribing Education in Medical Schools

## Evidence

AAMC survey (102 medical schools): 87% cover SUD, pain management topics in curriculum

UMass recognized for its Opioid Safe-prescribing Training Immersion (OSTI)

Boston U School of Medicine study of Objective Structured Clinical Examination (OSCE) training (39 internal medicine residents): Greater prescribing knowledge and confidence, practice changes

**Grade: C**

Sources: AAMC Survey, UMass OSTI, Boston U Study

## Cost Benefit

$65/student cost of additional resources to do Objective Structured Clinical Examination (OSCE) training

Conceivable that practice changes lead to lower opioid prescribing

$2.6k estimated cost/avoided OUD: $65/student/year / [25% reduction in prescribing * 40% of OD deaths involve prescription opioid * 50% of MDs in prescribing roles * 50% would lower prescribing anyway)

**Grade: A**

Sources: University of Toronto Cost Study, Trends in Opioid Use

## Scalability

$1.3M cost to educate all 20k residents/year and prevent up to 500 OUDs/year (and avoid opioid side effects for many more)

Scale within medical schools

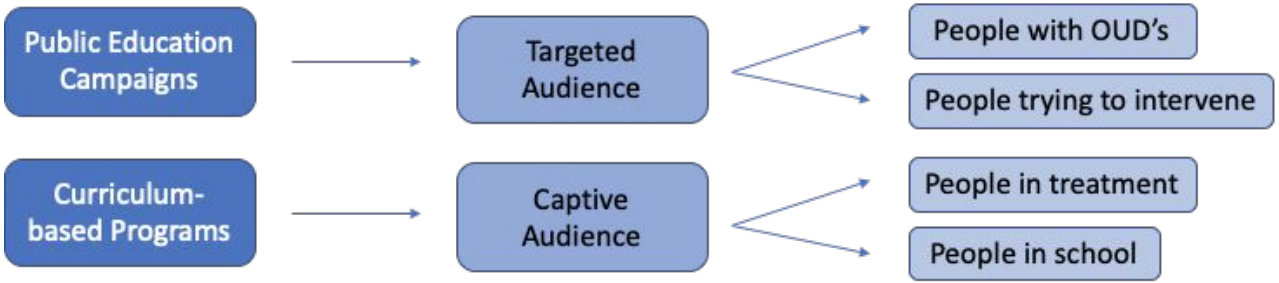
AAMC-reported challenges: Lack of faculty and resident expertise on safe-prescribing practices, limited time to cover/add content, and lack of “owner” of pain based on current rotation specialists

**Grade: A**

Sources: AAMC Survey

# Focus Area #4: Preventive Education Campaigns

*Overview*: Preventive education campaigns are a popular method of intervention for substance abuse disorders. Proponents argue that disseminating information via education campaign will decrease the number of people using and abusing opioids. Campaigns range in content from familiarizing the public with naloxone administration to dissuading teenage opioid abuse. Programs with defined curricula, usually targeted to at-risk populations, are another popular strategy. Private sector companies, government agencies, and non-profit organizations are eager to spearhead their own efforts, though campaigns across sectors have not always been based on evidence.



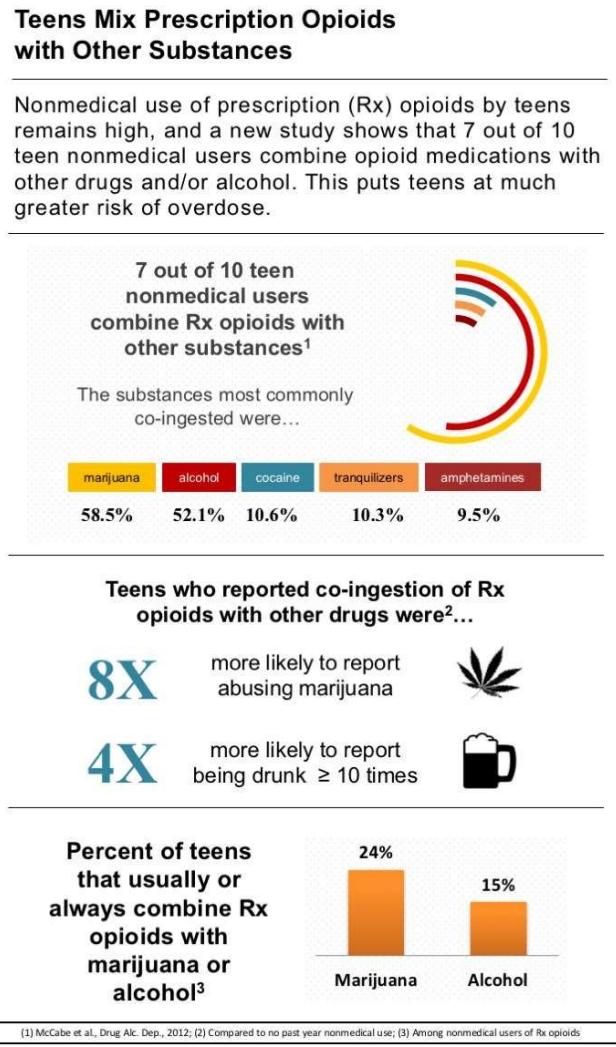

*Key Experts and Expert Organizations*:

- Patricia Conrod, Founder of Preventure, University of Montreal
- Christy Hartsell, VP of Partnerships and Co-Marketing, Truth Initiative
- Fred Muench, President and CEO, Partnership for Drug-Free Kids

# Preventive Education - Problem Spotlight: Opioid Use Disorder in Teenagers

*Overview*: Typically, tennagers abuse prescription drugs, rather than heroin. Experts have found that some public education campaigns are more effective when geared toward parents rather than teenagers themselves. As a result, most online content regarding intervention and prevention targets parents and caregivers. Curriculum-based programs are usually implemented in schools if they are trying to reach at-risk teenagers.

- Approximately 912,402 teenagers misused opioids in 2016 (3.6% of adolescents in the US between ages 12 and 17)*
- 17% of high school seniors self-report as having misused opioids**
- About 2,117 overdose deaths in teens and 250,000 opioid-related emergency room visits by teenagers annually***




*Source: HHS
** Source: Public Health Newswire
***Source: HHS

Source: drugabuse.gov

## Intervention Spotlight 1: Preventive Education Programs
## RECOMMENDED INTERVENTION: Preventure

### Evidence

2 RCT's proving that effect size is significantly negative

Newton et. al.: ES is -0.225 for consuming alcohol; similar for alcohol-related activity; more significant for binge drinking

Conrod et. al.: Similar findings that alcohol use decreased

**Grade: B**

### Cost Benefit

Curriculum costs for 4 facilitators total $3,300-3,500 plus $14/person for manuals. Assuming 4 facilitators can serve 100 people, costs for 100 people would therefore be $4,900. The program is clearly correlated with lower rates of alcohol consumption which could generate significant savings. If we assume for every 100 people treated, 22 stop engaging in alcohol consumption, that could generate $17,754 in societal benefits.*
**Grade: B**

*source: CDC

### Scalability

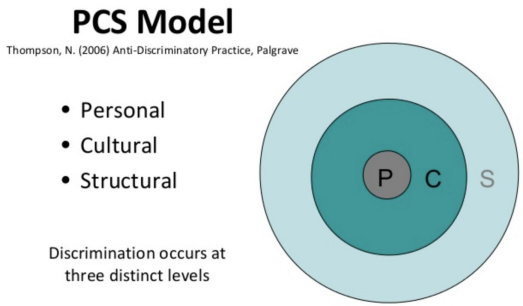
Highly scalable; already operates in Canada, UK, Australia, as well as in several US school and through non-profits here.

**Grade: A**

# Focus Area # 5 Stigma-reduction and Advocacy

*Overview*: Stigma operates on multiple levels, patient/ individual, provider, community,and structural level, and has been identified as a key barrier to treatment seeking. At an individual level, people with OUD tend to seek treatment later due to an internalized stigmatization, providers are more likely to treat patients with OUD with less empathy, social networks and sources of support are curtailed by societal perceptions of OUD and MAT, at a systems/ structural level comprehensive treatment for OUD and other SUDs are siloed, separated from the rest of the medical field increasing opportunities for loss to follow up, interruption in treatment.

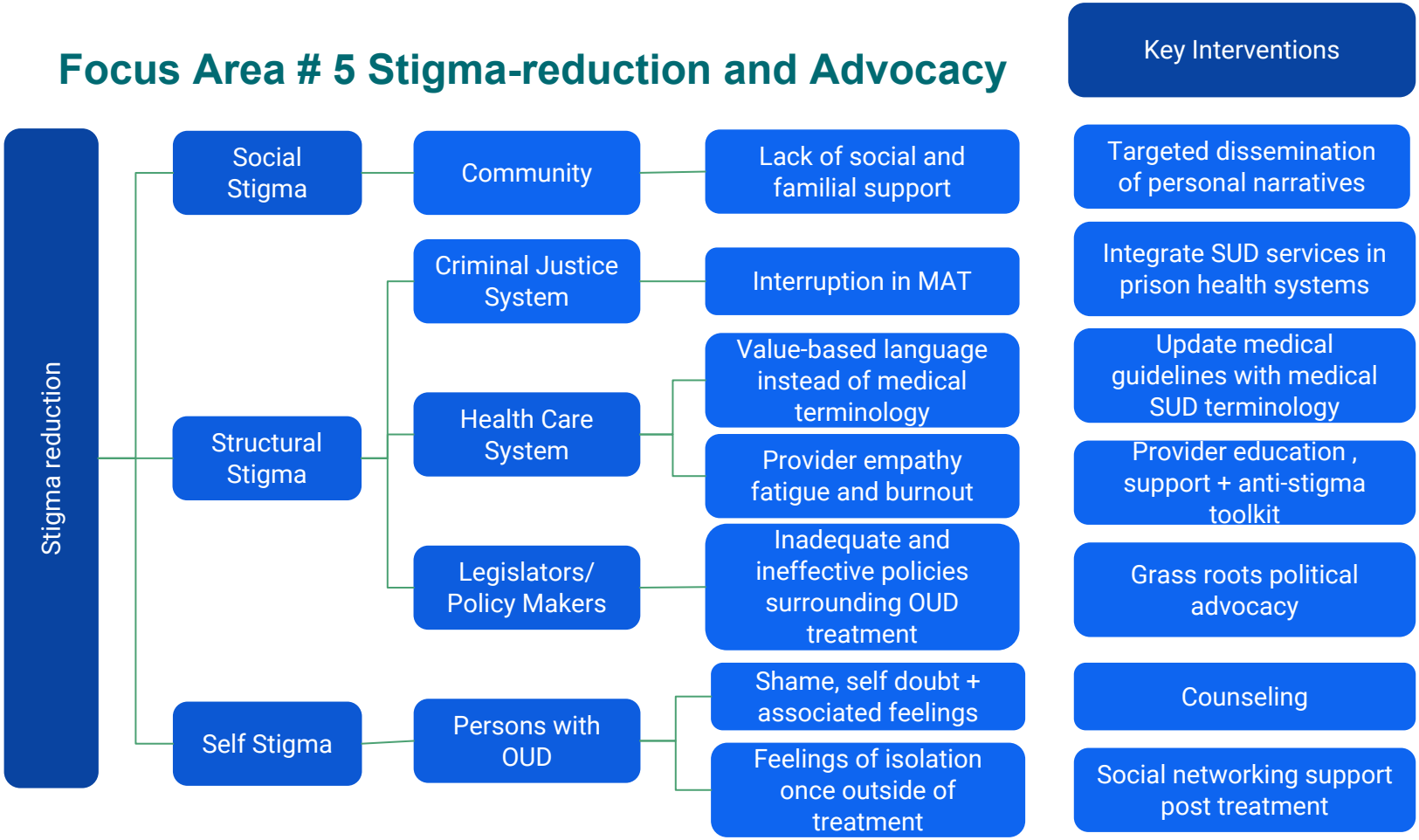
- In a recent National Survey on Drug Use and Health, persons affected by OUD reported stigma as a barrier to seeking treatment:[1]
  - 17.2% cite the potential of causing their neighbors/ community to have negative opinions
  - 20.5% cite the fear of potential negative effect
  - 7.1% report not wanting others to find out




*Key Expert Organizations*:

- Shatterproof
- AMA Alliance
- Faces and Voices

# Focus Area # 5 Stigma-reduction and Advocacy



# Stigma-reduction and Advocacy: Problem Spotlight

*Overview*: Perception of OUD as a moral failing instead of a medical illness. Experts have found that this lack of objective classification has This has great repercussions at the systems level, mainly highlighted in prison-justice systems, health treatment facilities, and in the lack of services in place to support individuals post-treatment and recovery.

- SAMHSA recently found that **50% of drug courts** do not permit the use of methadone or buprenorphine for treatment in any circumstances.[2]
- A national online survey on primary care physicians found that **89%** of them attributed personal responsibility of obtaining OUD to the individual.[3]
- More than **60% of primary care physicians** expressed negative feelings about patients with OUD.[3]
- A nationally representative web-based survey found that **78% of respondents** believed that persons with OUD were to blame for their problem, **72%** believed that persons with OUD lacked the self discipline to use MAT without becoming addicted.[4]

*Key Report/Study*:

- Changing The Language of Addiction
- Stigma, Discrimination, Treatment Effectiveness and Policy Support: Comparing Public Views about Drug Addiction with Mental Illness
- Social Stigma Toward Persons With Prescription Opioid Use Disorder: Associations With Public Support for Punitive and Public Health-Oriented Policies.
- Primary care physicians' perspectives on the prescription opioid epidemic
- Medical Assisted Treatment and The Criminal Justice System

# The PAF Team

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# Financial Conflict of Interest

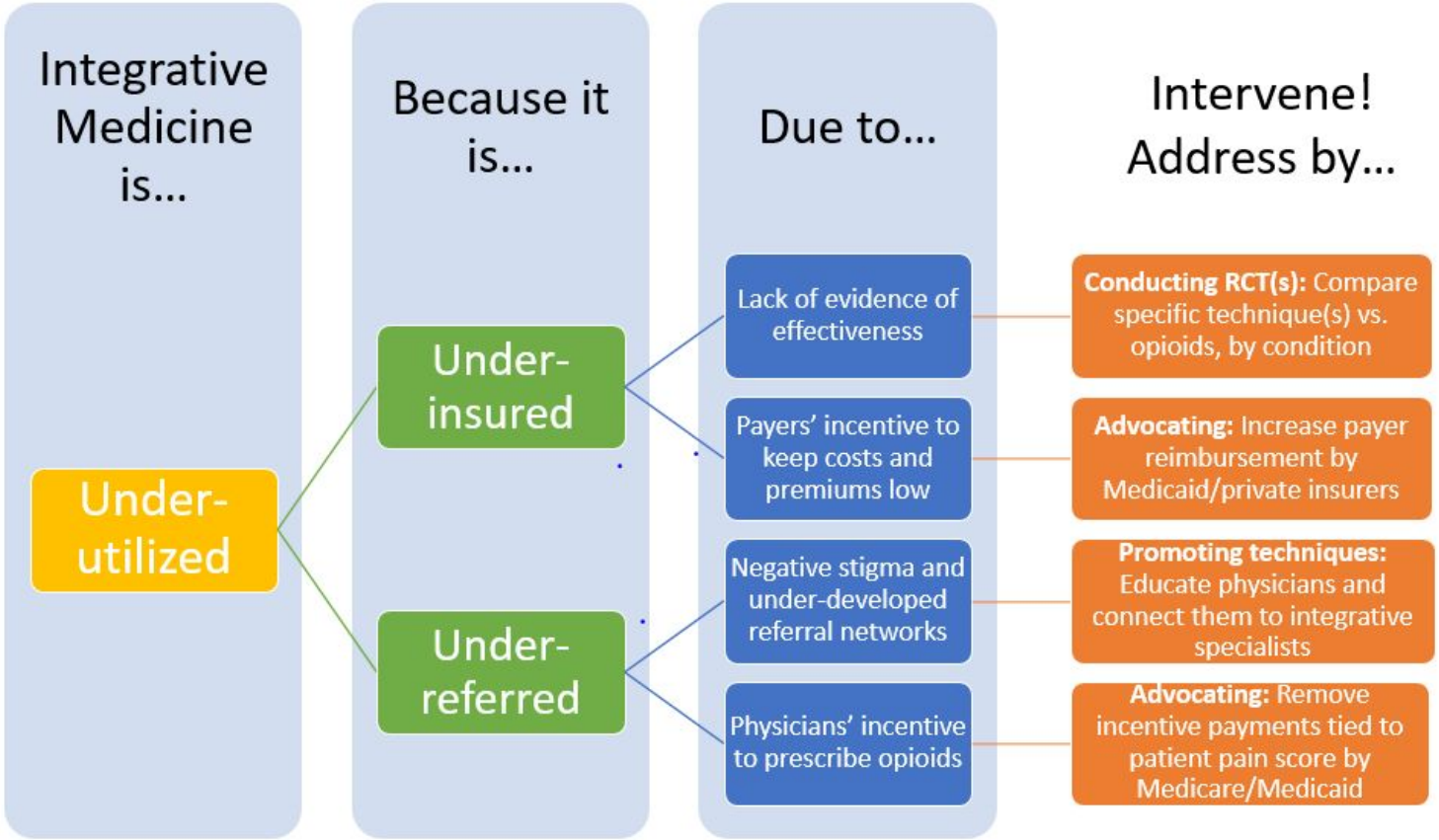
Eric Gastfriend is Co-Founder and CEO (salary, stock) of DynamiCare Health, Inc., a tech startup which offers a digital platform for automating Contingency Management. The company also plans to integrate computerized Cognitive Behavioral Therapy content into the product.

Eric's father, David Gastfriend MD, is Co-Founder and Chief Medical Officer (salary, stock) of DynamiCare Health. He is also involved with multiple other organizations:
ASAM / RecoverySearch (Level-of-Care Treatment Matching) – Royalties
Alkermes (Vivitrol / naltrexone) – Options/Stock
Intent Solutions – Options/Stock
BioCorRx, Indivior, Kaleo, Purdue, Recovery Centers of America, IBM Watson/Truven Health Analytics, Rand Corp, US WorldMeds – Consulting fees

Eric was not involved in the decisions to rate or recommend interventions with financial conflicts of interests to him or his family.
Contingency Management, Computerized CBT: Decisions made by Josh Feldman
Level-of-Care Treatment Matching: Decision made by Nishant Uppal

# Appendix

## Back-up: Integrative Medicine Framework



# Back-up: Integrative Medicine Follow-ups to Sarah

**Question:** What is the “gold standard of care” in integrative medicine?

**Answer: Multidisciplinary treatment,** especially in pain’s early stage

- Multidisciplinary biopsychosocial rehabilitation (MBR):
  - Physical component
  - Psychological, occupational, or educational component
  - 2+ clinicians from different disciplines
- Moderate quality evidence that multidisciplinary treatment results in larger improvements in pain and function (difference equals 1 point on a 10-point scale)
- Moderate quality evidence that multidisciplinary treatment doubles the likelihood of someone returning to work in the next 6-12 months
- **MBR programs are costly and time-intensive**

Sources: Cochrane meta-analysis, NICE

**Question:** What is the quality of research on efficacy?

**Answer: Low** - some meta-analyses of RCTs, though many RCTs have small sample sizes, inconclusive results, and/or high risk of bias. More research is needed to compare techniques to opioids and each other as well as compare cost-effectiveness

- Cochrane has reviewed 16 intervention types
- AHRQ has assessed non-pharma treatments
- **NCCIH has highlighted pain research as a priority**
- Insights from expert interviews:
  - Choice of treatment based on individual’s case
  - Recommend trials that compare opioids and alternative treatments of one specific condition
  - RCT may not be the best evaluation tool for alternative techniques like acupuncture?

Sources: Cochrane, AHRQ systematic review, NCCIH

# Backup: Research on Psychedelics

*Overview*:

- Psychedelic medications have been posited to hold therapeutic benefits for patients with OUD, but their medical use remains prohibited based on their classification as Schedule I drugs
- Existing pharmaceutical manufacturing processes and prescription/dispensing networks would make psychedelics both cost-effectiveness and scalable as an intervention
- However, still a strong need for research to validate the efficacy of these drugs in OUD
- There are a some private funders of psychedelic studies, but few that are based in the United States and even fewer that are exploring how psychedelics can be used to treat OUD:
    - Multidisciplinary Association for Psychedelic Studies
    - Atai Life Sciences - Compass Pathways
    - Heffter Research Institute
    - Beckley Foundation

*Emerging Climate*:

- Recent reports have suggested that support for approving psychedelic drugs as treatments for certain medical conditions is growing
- Validated studies on psychedelic efficacy will become even more important as the legal tide starts to shift
- Funding these studies represents a low-barrier opportunity to capitalizing on the potential effectiveness of these drugs in the event

*Recommendation:*

- Consider offering grants for new randomized control trials (RCTs) investigating the benefits of psychedelics for patients with OUD

# Stigma-reduction and Advocacy: Intervention spotlight

*Overview*: Digital storytelling (DST) for social and behavioral change, connect personal narratives and public health messaging

- DST is versatile and has been used in various other public health campaigns as a means of stigma reduction:
- *Quality of Evidence:* DST in the field of SUD is relatively new, current pilot studies are either being monitored or in the early stages of evaluation
    - *Proxy measure: Multisite Randomized Controlled Trial, Cost Effectiveness Analysis, n=701*

- *Cost Effectiveness: TBD*

- *Scalability:* **Over 85% of the population** has access to the internet, **over 60%** have access to smartphones- this style of intervention has the potential to reach a wide audience.[5,6]

- **Example: SMC Behavioral Health and Recovery Services carries out DST services to reduce stigma surrounding HIV/AIDS, mental health, and community violence.**
    - In each focus area **90% + of consumers** reported having learned something new, **greater than 70%** of consumers reported being able to sympathise with the storytellers and their specific focus area.
    - SMC also carried out a “Train the Trainer” trial to relay stories of mental health and substance abuse to healthcare providers and found that **74% of providers** sympathised with the storytellers who reported substance use disorders.

*Key Report/ Study:*

- Coleman L, 2008, and Hamblen, 2018

# Intervention Spotlight 2: Harm Reduction Intervention Programs -- Teen Intervene

## Evidence

Teen Intervene identifies high school students that may be drinking excessively and facilitates interventions.

2 RCTs*; average effect size was -0.759 for substance use disorder

**Grade: B**

*Source: http://www.wsipp.wa.gov/BenefitCost/Program/647

## Cost Benefit

According to the Washington State Institute for Public Policy, the program costs $391/participant and generates $1,777 in benefit.

Overall, the program provides $1,385 in benefit.

**Grade: B**

## Scalability

Program is proven to be effective for high school students; it has not been tested on the general population so overall effectiveness remains unclear. But scaling from high school to high school appears feasible.

**Grade: B**

# Intervention Spotlight 3: Harm Reduction Intervention Programs -- Community Reinforcement and Family Training (CRAFT)

## Evidence

CRAFT engages friends and families of people with SUD's and teaches them effective strategies for intervention.

1 RCT and several other studies*; effect size for "engagement" was 1.223

**Grade: B**

*Source: http://www.wsipp.wa.gov/BenefitCost/Program/340

## Cost Benefit

The CRAFT curriculum costs a family about $199 to purchase. According to sellers, CRAFT is successful at getting individuals to enter treatment 71% of the time. Reaching one individual who is addicted to drugs saves society between $4 and $11 per dollar spent on treatment.*

Given these figures and the success rate of CRAFT, the benefits of CRAFT could then be estimated at approximately $1,059/individual.

**Grade: B**

*Source: https://drugabuse.com/financial-toll-addiction/

## Scalability

The program is likely highly scalable. While some programs implementing CRAFT target adolescents and youth, others aim to reach all segments of the population.

**Grade: A**

# Intervention Spotlight 5: Preventive Education Programs -- DARE Keepin' it Real

## Evidence

After evidence showed that the original DARE curriculum was ineffective -- in some cases, even harmful -- the organization designed a new curriculum that focuses on general dignity and respect rather than lectures about avoiding drug use from police officers.

2 RCT's; Among those already using alcohol, 1 in 10 quit, but not significant on tobacco and marijuana use

**Grade: B**

## Cost Benefit

If we assume that the program takes 3 hours a week for 26 weeks (78 hours) and that the average teacher salary is $49,000/year, teachers earn approximately $23.50/hour. Therefore, the cost of DARE KiR is $1,833/classroom/year.

Alcoholism can cost society $807/person per year.* If 10% of students quit due to participation in DARE KiR, and assuming a class of 30 students, that could save $2,421/year.

**Grade: C**

*Source: https://www.cdc.gov/features/costsofdrinking/index.html

## Scalability

~4M students entering middle school each year in US; ~200,000 could benefit.

DARE KiR is operating in 50-60% of school districts in the US.

**Grade: A**

# Intervention Spotlight 6: Stigma Reduction/Advocacy -- Project Expansion of Community Healthcare Outcomes (ECHO)

## Evidence

There is little evidence for this method of provider education and collaboration. While there have been some promising implementations of Project ECHO (most notably with Hepatitis C), experts caution that there are no RCTs proving its effectiveness. Additionally, instances where it was successful were highly circumstantial.

**Grade: C**

## Cost Benefit

According to one study, the incremental cost-effectiveness ratio with Project ECHO versus usual care was $10,351 per QALY.*

The same study concluded that initial treatment costs may increase, but that cost effectiveness could increase for those in underserved areas.

**Grace: A**

*Source: https://gastroenterology.acponline.org/archives/2017/11/28/3.htm

## Scalability

Project ECHO is being used at 130 locations in the US as well as 23 other countries.

Several foundations have made significant contributions to Project ECHO programs to help with its expansion.

**Grade: A**

# Intervention Spotlight 7: Stigma Reduction/Advocacy -- Repeated Dose Motivational Interviewing (REBOOT)

| Evidence | Cost Benefit | Scalability |
| --- | --- | --- |
| REBOOT, one form of repeated dose motivational interviewing, has been found to be effective in 1 RCT.<br><br>Overdose events decreased, though there was no effect on days of opioid use or substance use treatment.<br><br>**Grade: B** | **Grace: ?** | Results may not be generalizable beyond San Francisco, which boasts robust services including naloxone distribution and agonist treatment for opioid use disorder available within 48 hours of request.<br><br>**Grade: C** |

*Source: https://gastroenterology.acponline.org/archives/2017/11/28/3.htm

# Intervention Spotlight 8: Stigma Reduction/Advocacy -- Fentanyl Detection

## Evidence

Few studies have been conducted, and no RCTs. One study that relied on interviews with drug users in several cities concluded that fentanyl testing strips would alter their drug use behavior.*

**Grade: C**

*source: http://americanhealth.jhu.edu/sites/default/files/inline-files/Fentanyl_Executive_Summary_032018.pdf

## Cost Benefit

The cost of 1 fentanyl testing strip is $2. If there was evidence that these strips could divert an overdose, the benefits in healthcare savings could amount to ~$90,000.*

**Grace: A**

Source: https://www.modernhealthcare.com/article/20180220/NEWS/180229993

## Scalability

Fentanyl testing strips are affordable and widely available.

**Grade: B**

# Intervention Spotlight 9: Harm Reduction Intervention Programs -- Prosper

## Evidence

One large-scale RCT with n=11,000 has shown promising results and there have been over 80 publications based on the program.

Youth who received treatment showed lower drunkenness, tobacco usage, and marijuana usage.*

**Grade: A**

## Cost Benefit

According to WSIPP, program costs are estimated at $539/individual. Benefits are estimated at $843/individual.

**Grace: C**

## Scalability

This program, while targeted mainly at adolescents, is highly scalable because it is available for schools to purchase.

**Grade: A**

*Source:
http://helpingkidsprosper.org/proven-results

# Intervention Spotlight 10: Stigma Reduction/Advocacy -- Digital Storytelling

| Evidence | Cost Benefit | Scalability |
| --- | --- | --- |
| One RCT demonstrated that storytelling is effective at increasing empathy and motivating others to take action after feeling empathy for a stigmatized group. There are few RCTs directly related to storytelling and those with OUD's.<br><br>**Grade: C** | **Grade: ?** | Implementing a storytelling component to treatment programs seems feasible, but there is little research on this. Due to this uncertainty, we can assume that storytelling is moderately scalable.<br><br>**Grade: B** |