OVERUSE AND UNDERUSE OF ACUTE HEALTHCARE: EVIDENCE FROM MALI

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Introduction: curative care and the challenge of misallocation

- Global health has seen great advances in *preventive care* in the last two decades (e.g. Bhatt et al. 2015).
- Today: further significant improvements require better care for *acute illness*.

- In curative care: whether and when a given individual needs treatment varies based on (unobserved) health status.
 - → Misallocation underuse and overuse is a core challenge for efficient and high-quality provision of acute care.
- Linked to Good Health And Well-Being (SDG 3)



Introduction: underuse and overuse in LMIC contexts

Underuse remains a challenging problem despite substantial progress:

 In 2019, 5.2 million children under 5 died, mostly from preventable and treatable causes

Part of the policy response: a shift to free care for children and mothers, away from "user fee" model (incl. in Mali, Adepoju, 2019).

At the same time: medication misuse documented since at least 1990

- WHO medicines use summary report 2006
- Experimental and audit study evidence (Das et al. 2012, 2016, Currie et al. 2011, 2014, Cohen et al 2015)

Subsidies for patients may reinforce financial incentives for providers.



Introduction: multiple constraints to the optimal allocation of care

Efficient allocation of care influenced by multiple, complex decisions.



Many potential sources of misallocation:

- Financial or informational constraints
- Misaligned incentives between government, providers, caregivers, and patients
- Asymmetric information: the "informed expert" problem

Different issues may interact or mutually reinforce each other. Example: lack of trust by patients \rightarrow lack of effort to diagnose by providers (Hussain et al. 2021)

This talk: 3 (+1) studies from Mali: experimental evidence on underuse and overuse of curative care, with new measurement approaches.





RCT of healthcare subsidies and health information provided by CHW.

- 1. Subsidies, Information, and the Timing of Children's Health Care in Mali (Sautmann, Brown & Dean, 2020)
 - Examine decision to seek care (extensive margin) for children under 5: construct illness spells, assess need for provider evaluation using C-IMCI guidelines for CHW
- 2. Gender Differences in Children's Antibiotic Use and Adherence (Blandhol & Sautmann, 2021)
 - Examine antibiotics adherence: construct treatment "spells", compare with W.H.O. guidelines for minimal treatment length





RCT to isolate contributors to misallocation of subsidized malaria medication.

3. Does Patient Demand Contribute to the Overuse of Prescription Drugs? (Lopez, Sautmann & Schaner, 2021)

Intervention: vouchers for malaria ACT either directly to patients, or to the provider When doctors have discretion, do they steer patients towards more or less use?

+ The Effect of Provider Training vs. Improved Patient Information
on Malaria Treatment Misallocation (*Lopez, Sautmann & Schaner, unpublished*)
<u>Intervention:</u> information on malaria test (RDT) efficacy to either doctors -- through a day-long training -- or patients -- through a short informative video.

Does information encourage adherence to test results?



Connecting the dots: how do underuse and overuse interact?

In care seeking,

- Underuse (by IMCI) alleviated, but not eliminated, by subsidies
- Overuse significant *share* of the newly created provider visits (30%)
- Information does not improve this allocation.

Esp. when costs are low, **providers** at the clinic fail in their "gatekeeping" function

- Patient pressure a significant factor in overuse
- Informed doctors are better gatekeepers, yet patient satisfaction falls.

Medication use: after purchase, cost is low -- but underuse (low adherence) is common and even higher for girls than boys.

Multiple margins of overuse and underuse:

- Do these interact and possibly reinforce each other?
- What are "net" effects on health outcomes?







Primary health care provided by community health clinics (CSComs)

 Public health in Mali: decentralized, communitybased care funded by user fees



- 47% of mothers in Bamako took child with fever or cough to a CSCom (DHS 2013)
- ~70 clinics and associated reference hospitals in Bamako.
- A typical CSCom in our malaria data set (data set 2, N = 59):

Variable	Mean	SD
Self-reported patient load/day	29.7	22.1
Has a laboratory (microscopy)	87%	35%
Has a pharmacy/dispensary	100%	-
Average number of staff with prescription power	11.1	4.4
Stockouts of any malaria drugs (out of 6 clinic-days)	69%	47%
Stockouts of all malaria drugs (out of 6 clinic-days)	1.7%	13%



Our Samples

 Action for Health data: home survey of 1768 children in 642 compounds; families eligible for the subsidy/CHW program



• Clinic data: 2055 patients with acute symptoms at 60 CSComs in Bamako

	Action for Health (household head)	Clinic data (patient)
Literate	46%	26%
Salaried employment	13%	-
Household members	6.2	10.3
Average monthly income p.p. in CFA	26,000	22,000
Average distance to clinic in meters	512	-



Care Seeking for Children

The effects of user fee removal and CHW visits on the decision to visit a clinic



Motivation



- Subsidies reduce underuse due to access barriers (credit constraints, incorrect beliefs,..) but may also lead to overuse; information may improve allocation.
- Experiment: compounds randomly selected to receive...
 - subsidies: pay clinic user fees for five most common conditions
 - Information: biweekly community health worker visits
- Policies that reduce the cost of acute care often have little health outcome effects (or even utilization effects, e.g. King et a. 2009, Thornton et al. 2010)
 - Measure health utilization with diary data against C-IMCI benchmark
 - Caveat: assume that compliance with IMCI improves health ("underuse")
- Treat decision to seek care as a "stopping problem": go today, or wait another day?
 - → IMCI: classify as "early for care" or "care required (today)"



The Data Collection

• Surveyor assisted health diaries: 10+5 symptoms...

16
51%
33%
32%
9%
5%

...and doctor consultations and medication purchases

Type of visit	Number	Cost (Price)
CSCom	646	1344 (3767)
CSCom with subsidy	508	933 (3794)
CSCom without subsidy	138	2850 (3666)
Private provider	89	5470
Informal/no consultation	2691	218

ID Ménage :____ Nom de l'enfant :___ E SYMPTÔMES Jour Mère été inquiété pour la santé de l'enfant Convulsions, SCO) crises, ou spasmes Léthargique/ moins conscient Refuse l'allaitement ou de boire Vomir tout Toux ÷ Difficulté à respirer Diarrhée (HA Peau chaud à toucher Médecin visité Pharmacien visité

Probability of care seeking on each illness spell day, by "care required" classification using the IMCI



Summary of findings

- >5x higher probability of care on care-required days than on early days
- → Parents can clearly distinguish differential need for care by child's health status
- Subsidy increases care seeking probability by 250%
 - ~70% of new visits are IMCI recommended care.
 - 71% of care-required spells still don't receive care.
- \rightarrow Underuse alleviated, but not eliminated, by subsidies (with caveat)
- → Underuse and overuse increase at the same rate; despite minimal probability of overuse, a significant share of total use (30%)
- Additional information provided by CHW does not improve the allocation.



Patient Demand for Treatment

Does patient demand contribute to the overuse of malaria drugs?



The overtreatment puzzle

- The policy challenge: when at the clinic, a lot of overtreatment/wrong treatment
- From home visit data:
 - 42% of malaria-negative patients receive treatment
 - 20% of malaria-negative patients and 53% of malaria-positive cases receive treatment for severe malaria
- Is this driven by providers?
 - Patients do not always buy prescription
 - Severe treatment >2x more expensive
- Or driven by patients?
 - Before consultation, 55% of patients believe to have malaria
 - 57% of health workers report pressure to prescribe

Requires "reluctant compliance"



Randomized rotational design: three pricing conditions for "simple" malaria treatment (ACTs)

"Control days": no malaria discounts available

"Patient Voucher" days: voucher for free simple malaria treatment (ACTs) given to patients

- Not valid for "severe" treatment (injections)
- Received *before* seeing the doctor



"Doctor Voucher" days: doctors obtain the same vouchers to give to patients as they see fit

- Same terms and conditions as PV
- Patients do not know ACT is free before seeing the doctor.



Who drives overtreatment? Different predictions for treatment effects

- Vouchers to patients (PV): increases their demand for "simple" ACT tablets at the expense of "no" and "severe" treatment
- Vouchers to doctors (DV): at same prices, they can use the information advantage to either
 - 1. keep overall demand low, reduce demand for severe treatment only
 - \rightarrow patient-driven overtreatment
 - 2. increase overall demand, keep demand for severe treatment high
 - \rightarrow doctor-driven overtreatment.



Patient-Driven Demand: More Vouchers, More Malaria Treatment in PV vs. DV





Additional results

- No evidence of doctor-driven demand: less severe treatment in both DV & PV
- Poor illness-treatment match, worse in PV than DV (although some improvement from greater purchases as a result of the subsidy)

- Intervention 2: doctors who received additional training make better prescriptions
 - But: lowers patient satisfaction



Summary of findings

- (Some) overuse driven by patient demand
- Information (training) has effects on the doctor side but not on the patient side.
- \rightarrow "Twin problem": *underuse* at the extensive margin (*whether* care is received) but *overuse* at the intensive margin (*how much* care is received)
 - Do these reinforce each other? A problem of distrust? (Hussain et al. 2021)
- A challenging policy issue:
 - The provider is the "informed expert"
 - Monitoring would require observation by another qualified provider
 - Can empowering *providers* improve the allocation?



Treatment Adherence

Gender and parental education as factors in antibiotics treatment adherence



Antibiotics use conditional on child gender and household characteristics

- Construct antibiotics treatment spells and benchmark "exit" against WHO recommendations
- Estimate probability of starting and completing treatment as a function of gender and other variables (correcting for selection)

Antibiotics taken		Standard recommendation
Total	712	
of which:		
Co-Trimoxazole	33%	5 days, 3 for bacterial enteritis
Amoxicillin	25%	5 days, 3 for tooth infections
Metronidazole	16%	5 days, 3 for giardiasis
Other/unspecified	12%	
Ceftriaxone, Gentamicin, Erythromycin, Ampicillin	14%	5-7 days for most uses.



Antibiotics use conditional on child gender





Antibiotics completion conditional on education of household head



Gender effect by education level. Reference category: no formal schooling.



Summary of findings

- Despite low costs of adherence:
 - significant underuse
 - the presence of a (literate?) parent matters significantly
 - \rightarrow Subtle biases may affect other aspects of treatment success.

Given high levels of overprescription – is low adherence "underuse"? What is the correct policy response?







Conclusion



- Multiple margins of misallocation in the healthcare decision process
- "Blunt instruments": subsidies may address underuse at the extensive margin, but exacerbate overuse at the intensive margin
- Need for research:
 - How do incentives and policy interventions change utilization at different decision margins?
 - How do these changes, individually and in the aggregate, map into welfarerelevant outcomes (health, income, happiness)?
- Two new methods of measurement:
 - Health diary data on illness and medication spells
 - Facility entry and exit interviews combined with home testing to assess the match of illness with correct treatment





