



HOW ORBIS RESEARCH CAN CHANGE LIVES

Hunter Cherwek, MD Orbis International

6/1/2018



THE PROSPER STUDY

“Can improving vision increase the productivity of workers in poor areas?”



“Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on raising output per worker.”

**-Paul Krugman
Economics Nobel Laureate**



BACKGROUND: HEALTH AND PRODUCTIVITY

- **UN Sustainable Development Goals call for:**
 - **End to poverty**
 - **Health for all**
- **Global health policy assumes good health and productive work are causally linked**
- **But very few trials have assessed health interventions to increase work productivity in low-income countries**
- **Mostly modest effects with nutritional interventions: Challenging distribution pathways and compliance requirements**



BACKGROUND: PRESBYOPIA

- **Presbyopia is the universal decline in near vision with aging**
 - **Starts at age 40 and complete by 55, so it strikes during the heart of the working years**
 - **The most common cause of vision impairment: > 1 billion affected worldwide**
 - **Annual global productivity loss > US\$25 billion**
-



BACKGROUND: PRESBYOPIA

- **Safely, effectively and inexpensively corrected with glasses**
 - **Rates of glasses use in poor countries as low as 10%**
 - **Uncorrected presbyopia is associated with significant difficulties in activities of daily living**
 - **But there are no high-quality studies on whether giving near glasses improves work productivity: It takes evidence to create action**
-



PROSPER (PRODUCTIVITY STUDY OF PRESBYOPIA ELIMINATION IN RURAL-DWELLERS)

- **Set on three tea estates in Assam, India**
- **High season (June-October): Productivity limited by the worker, not the tea plant**
- **Worker income tied to daily productivity as an incentive during that period**



PROSPER: WHO DID AND DIDN'T TAKE PART?

- **All permanent workers aged ≥ 40 years underwent eye exams**
- **Workers had to have presbyopia in both eyes:**
 - **Poor vision for near objects that could be corrected with glasses**
- **Excluded those with other eye problems (they received free care)**





PROSPER: “RANDOMIZATION”

- **Participants were assigned at random (like flipping a coin) to one of 2 groups:**
 - **Intervention group: Received free near glasses immediately after the eye exam**
 - **Control: Received similar glasses at the end of an 11-week evaluation period**



PROSPER: MEASURING FOR GLASSES

- **The purpose was to improve vision at the exact distance the participants needed for work**
- **Measurement for study glasses carried out with near vision chart placed on top of a tea bush**
- **Kept changing glasses power until participant saw 2-3 leaves and a bud appropriate for picking**





PROSPER: MAIN OUTCOME

- **Main outcome: Difference between study groups in change in mean daily weight of tea picked between 4-week baseline and 11-week evaluation**
- **Did the group who got glasses right away IMPROVE MORE in productivity compared to those who waited until the end of the study to get glasses?**



PROSPER: RESULTS

- **Among 2699 permanent workers, 1301 (48.2%) met age and work criteria and underwent eye exams**
- **Among these, 1297 (92.8%) completed examinations, and 751 (57.9%) were eligible for the study:**
 - 376 (50.1%) received glasses immediately
 - 375 (49.9%) waited to get glasses
- **Among them, 94.1% received the correct treatment, and 100% completed follow-up**



PROSPER: RESULTS

- **Both study groups were similar at baseline:**
 - > 75% women
 - Mean age 47 years
 - Most had early presbyopia
 - All agreed or strongly agreed: “Picking tea is the main source of my family’s income”



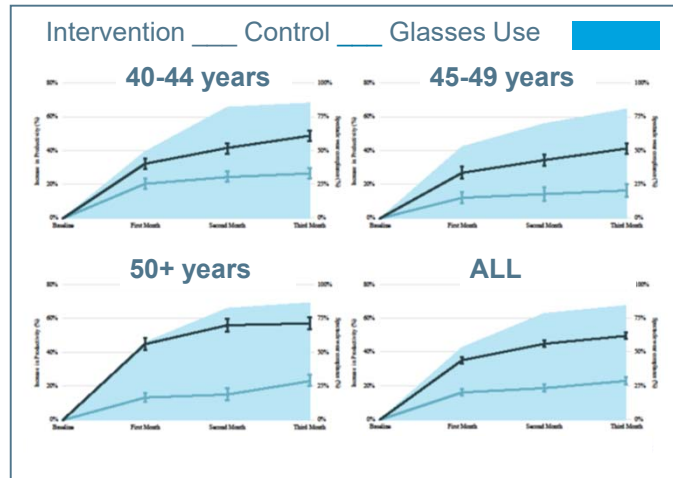
PROSPER: MAIN RESULT

- **The group who got glasses picked on average over 5 kg more tea per day than those who did not**
- **This was a 22% increase overall; productivity increased over 30% among the older workers (> 50 years)**
- **Statistically, this was considered a “large” to “very large” effect**





GREATER INCREASE IN PRODUCTIVITY WITH OLDER AGE AND BETTER USE OF GLASSES



WORKERS VALUED THEIR GLASSES

- **Nearly 90% were wearing their glasses daily by the end of the study: They saw the benefit**
- **98% found them “useful or very useful”**
- **95% would pay for a new pair if their glasses were lost or broken: an average of \$6 (enough to sustain a program)**



SUMMARY AND CONTEXT

- **Very significant increase in productivity in these rural, mostly-female workers with modest presbyopia, using a low-cost, well-accepted intervention**
- **Large majorities found glasses useful and would pay for them**
- **Greater effect size on productivity than previously found for any other health interventions**



WHY THESE RESULTS MAKE SENSE

- **Presbyopia gets worse with age**
- **Older workers had a much larger benefit from wearing the glasses**
- **As more and more workers started to use their glasses daily over the period of the study, the increase in productivity was greater and greater**



WHY THESE RESULTS CAN HELP ALLEVIATE POVERTY

- **Scale: Presbyopia is essentially universal, has its greatest impact during working years → large pool of potential beneficiaries**
 - **Sustainability:**
 - Glasses well-accepted
 - Distribution could be paid for by employers or workers themselves
 - **Importance: Increasing benefit to an aging global population**
-



THIS RESEARCH CAN LEAD TO SIGHT-SAVING PROGRAMS

- **There are many other settings in which workers can benefit**
 - **Other, less-formal studies show giving glasses may improve other economically important activities:**
 - Reading and writing
 - Use of tools and mobile phones
 - Cooking, sewing, weeding
 - Recognising money
 - **The kind of strong evidence provided by this study is needed to convince governments and companies to invest in programs**
-



**“Productivity
isn't everything,
but in the long
run it is almost
everything....”**



ORBIS STUDIES ON NOVEL TRAINING TECHNIQUES

*“Can simulation and distance learning help
younger surgeons to learn sight-saving surgery
better and faster?”*



WHAT IS THE NEED FOR NEW TECHNIQUES IN SURGICAL TRAINING?

- **Surgical training techniques that work well in richer countries may not be appropriate for the under-served areas where Orbis works:**
 - **Lack of surgeons who are “trained to train”**
 - **Cultural barriers against young doctors or those from rural areas getting to practice hands-on care**
- **Research is needed to prove which novel approaches work best in the real world**

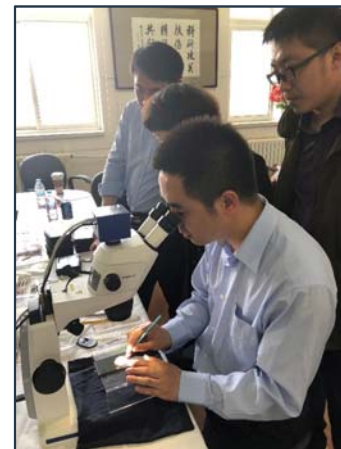
Enter Presentation Title or Footer under "Insert" Tab, Footer menu and apply to all

6/1/2018 | 23



OLIMPIC (OPHTHALMIC LEARNING & IMPROVEMENT INITIATIVE IN CATARACT SURGERY)

- **Problem: Few hands-on cataract training opportunities in China**
- **Question: Can training with low-cost, high-fidelity model eyes improve trainee surgery?**
- **Study: This on-going study is funded by Lions and based on Orbis China's existing surgical training project STEER**
- **Results available in 2019**



6/1/2018 | 24



DISTANCE LEARNING FOR CATARACT SURGERY IN PERU

- **Problem: Insufficient local trainers available, bringing doctors from outside not always practical**
- **Question: Can training at a distance using Cybersight actually improve resident cataract surgical outcomes?**
- **Result: Participation in a 5-week online training course on cataract surgery, taught by experts at Emory U, led to a very-significant 50% increase in surgery score, from 15.9 to 24.2, out of a max of 32.**

6/1/2018 | 25



Thank you!



Enter Presentation Title or Footer under "Insert" Tab, Footer menu and apply to all

6/1/2018 | 26