COLD CHAIN SOCIAL VALUE

Solar Direct Drive (SDD) Cold Chain Unit Results from Nigeria

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SDD COLD CHAIN UNIT SOCIAL VALUE RESULTS

$4.4m (PPP)

Cost to Nigeria Without 1 Cold Chain Unit for Vaccines

Note: Costs include illness and mortality avoided costs and treatment costs over 10 years with WHO recommended full vaccine set

SDD COLD CHAIN UNIT SOCIAL VALUE RESULTS

Number of Lives Saved

36,000

Note: Number of lives saved refers to the surveyed 1,490 B Medical SDD cold chain units in Nigeria over a span of 10 years

SDD COLD CHAIN UNIT SOCIAL VALUE RESULTS

Up to $14,828

Cost each time a cold chain unit breaks down

Note: Costs include vaccine wastage and social value from illness and mortality

SDD COLD CHAIN UNIT SOCIAL VALUE RESULTS

B Medical versus competitor brands

6 times less likely to break down

Note: Breakdown occurrences taken from a survey of 1,632 SDD units of various manufacturers from over 5,000 health centres across Nigeria

Social Value Research Summary

Social Value refers to the quantitative and qualitative value of a service or product to a society. In the context of immunisation, this includes the avoided mortality costs (losses in GDP), avoided treatment costs, and avoided burden on society. In 2016, researchers estimated that vaccines would save $544 billion in illness costs and $1.43 trillion in broader economic benefits in GAVI eligible countries alone. According to these figures, **immunisation programmes have the highest return on investment of any development initiative**. However, what is often overlooked in the valuing of immunization is the critical role that proper transport and storage of vaccines vis-à-vis cold chains play in this overall value.

Without reliable and accessible cold chain refrigeration the estimated social value from this research cannot be realized. Additionally, the costs of supplying vaccines, when improperly stored, are increased due to wastage and the administration of impotent vaccines. To evaluate the inherent social value of a single cold chain unit, two case studies were undertaken.

The first case study was conducted by surveying 245 health centres in Kano, Nigeria with B Medical cold chain units, the estimated averted social costs from an average B Medical cold chain unit for a full set of vaccines, as recommended by WHO, was **$4,497,356 (PPP) over its 10-year lifespan**. Additionally, the 245 B Medical units in Kano have the capacity to save over 6,000 lives and prevent over 37,700 cases of illness in the next decade. These figures were calculated using a per-vaccine prevented illness model, which estimated treatment costs, illness productivity losses, disability productivity losses and mortality productivity losses based on global research and data.

The second case study used data on 1,632 solar direct drive (SDD) units from over 5,000 surveys collected across Nigerian healthcare centres to analyze the reliability of SDD cold chain units and the effect that reliability has on the social costs. This research concluded that **per cold chain unit breakdown, the social cost ranges from $10,770 to $14,828 (PPP)**. The cost of vaccine wastage alone was $9,153 per breakdown of an average sized SDD unit. In a 12-month period, the reported number of breakdowns in Nigeria could have been responsible for over **300 lives lost and over 122,000 children going unvaccinated**.

Social Value Research Methodology

A model was developed to determine the estimated number of illness cases and mortality avoided by delivering a vaccines to the specified population. Illness incidence and mortality rates were derived from various global data sets, primarily from WHO, UNICEF, GAVI and academic research publications (a full list of citations is included in the full report). A custom social value calculator was developed from this model. It was used to convert the number of illness cases and mortality cases into avoided costs based on per country GDP per capita, population, birth rates. The per cold chain unit social value was projected from current data (up to 2015) for the next ten years and can be taken as 2016-2025. Treatment costs were based on prior research on care-seeking behaviour, hospitalisation rates and medical fees, and assumed to be 0.5% of total costs based on the initial findings. This research assumes a full set of vaccines are delivered through a cold chain unit at a normal productivity rate (derived from prior research estimates and local vaccination figures).

The reliability case study used survey data on collected on 1,632 SDD units of various manufacturers from over 5,000 health centres across Nigeria. It was based on a per breakdown model where the average breakdown of a non-B Medical SDD unit lasted more than 30 days. The research considered four scenarios per cold chain unit breakdown: A) Patient seeks service elsewhere, B) Patient returns to the same clinic after the SDD is repaired, C) Patient misses that set of immunisations, and D) Vaccines are immediately transferred to a a back up unit (an improbable scenario). Vaccine wastage was determined by per-dosage volumes for a full set of vaccines based on the per-vaccine coverage estimates in Nigeria. Average vaccines costs per dose were taken from UNICEF's latest figures. The average size of an SDD was taken across SDD models and manufacturers. Travel cost and time estimates were added to the previous social value calculator to determine a full set of costs for Scenarios A, B and C.

A full list of citations are provided in the B Medical Systems Cold Chain Social Value: Quantitative and Qualitative Research Findings (May 2016) report and the Cold Chain Reliability Social Value Results: Field Survey Results of Healthcare Centres in Nigeria (June 2017) report.