Identification and quantification of implementation challenges and costs associated with short-term, national-level vaccine switches



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INTRODUCTION

Switching one vaccine for another on a pediatric national immunization program (NIP) is often done when new vaccines become available. However, if poorly implemented, switching vaccines could result in suboptimal transitions with negative effects. 1-3 These negative impacts on health systems may worsen in settings where multiple vaccine switches for the same indication are made in quick succession.

To enable well-informed decisions regarding vaccine switches on NIPs, it is necessary to fully understand implementation challenges (inefficiencies) and costs associated when switching vaccines.

OBJECTIVES

- 1. Identify inefficiencies and costs associated with switching vaccines on NIPs.
- 2. Conduct a survey with vaccine experts to qualitatively and quantitatively assess implementation challenges when switching between multiple vaccines on NIPs over a short period.

METHODS

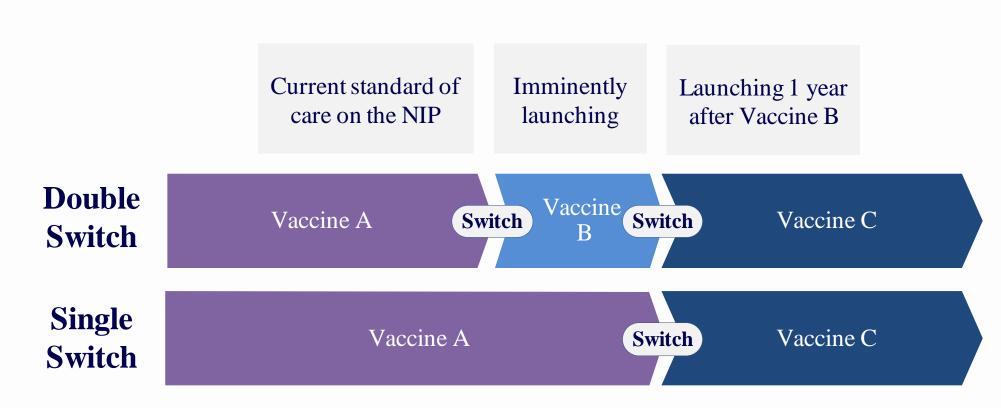
An English language literature review was conducted to identify vaccine switching inefficiencies. We categorized implementation challenges as either general/programmatic or manufacturer-related. Health system costs were also captured (Table 1).

Table 1. Identified implementation challenges and associated costs

General/Programmatic- related challenge (n=11)	Manufacturer-related challenge (n=7)	Health system-related costs (n=8)
Clinical considerations	Updating internal systems	Introduction and planning costs
Updating immunization plans/policies	Changes in existing schedule	Training costs
Scheduling routine immunization campaigns	New containers and packaging	Social mobilization costs
Cold chain, transport and storage	Usage of existing stock	Waste management costs
Procurement options	New supply network	Service delivery costs
Forecasting supply needs	Novel partnerships	Monitoring and evaluation costs
Updating LMIS	Reliability in delivery	Pharmacovigilance surveillance costs
Ensuring safe waste disposal		Cold chain supplement costs
Training and supervision of healthcare workers		
Advocacy communications materials		
Surveillance and monitoring		

- A closed-response, self-complete survey was developed and administered to vaccine experts (vaccine researchers; vaccine advocacy roles; payers; immunization policy roles; vaccine regulatory authorities) in Canada (n=10), France (n=10), Italy (n=10), Spain (n=11) and the United Kingdom (n=12).
- The survey qualitatively and quantitatively assessed inefficiencies and costs associated with vaccine switching over a short period:
- Three vaccines (A, B, & C) were considered (Figure 1). Vaccines A and C are produced by the same manufacturer, while Vaccine B is produced by another.

Figure 1. Double and single vaccine switching scenarios



- Participants first ranked general/programmatic and manufacturer-related inefficiencies in terms of importance and subsequently assigned an inefficiency value:
- 0% = inefficiency does not impact health outcomes.
- 100% = inefficiency completely cancels out all benefit of a vaccine's introduction for health outcomes.
- single switch would be associated with higher system costs. Participants were also asked to rate the importance of cost in their decision to

• Using a Likert scale, participants were asked whether a double switch vs. a

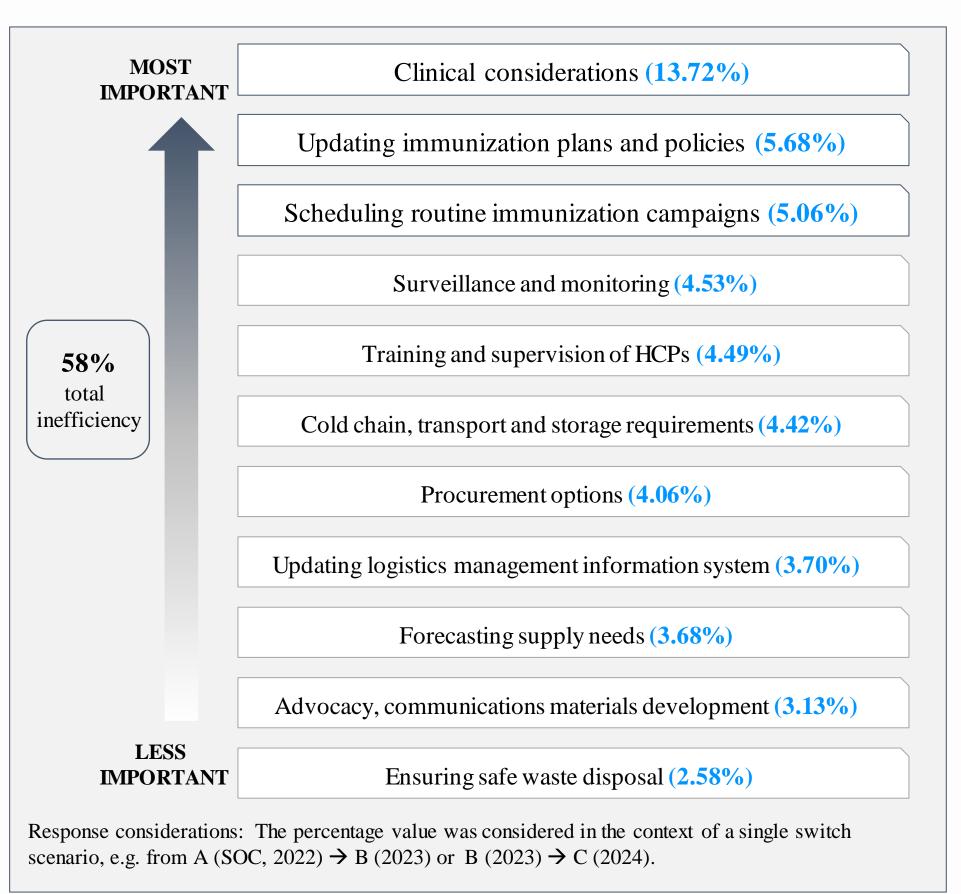
switch a vaccine in an NIP.

RESULTS

Ranking and valuing of general/programmatic inefficiencies associated with vaccine switching

- The top three general/programmatic-related inefficiencies were (1) clinical considerations, (2) updating immunization plans and policies, and (3) scheduling routine immunization campaigns.
- Across all participants (n=53), the average general/programmatic inefficiency value was 58% and single inefficiency values ranged from 13.72% to 2.58% (Figure 2).
- The mean overall general/programmatic vaccine switching inefficiency assigned by country was as follows: France 66.40%; Italy 65.50%; Spain 58.55%; Canada 55.50%; UK 46.50%.

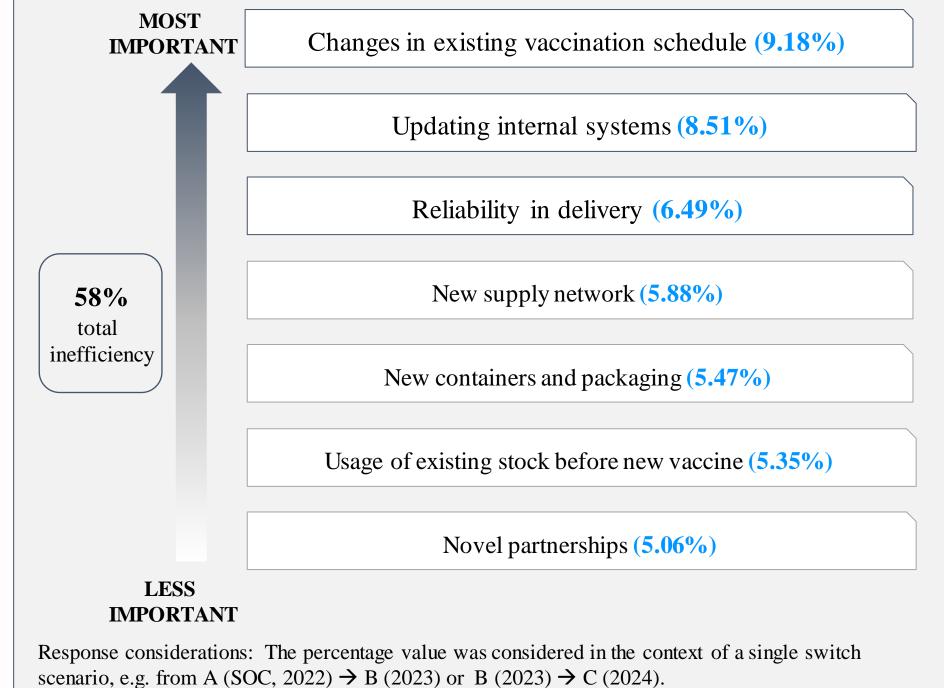
Figure 2. Mean stakeholder estimates of inefficiency values per general/programmatic-related implementation challenge



Ranking and valuing of manufacturer-related inefficiencies associated with vaccine switching

- The top three manufacturer-related inefficiencies were (1) schedule changes, (2) updating internal systems, and (3) reliability in delivery.
- Across all participants (n=53), the average manufacturer-related inefficiency value was 50%, and single inefficiency values ranged from 9.18% to 5.06% (Figure 3).
- The mean overall manufacturer-related inefficiency assigned by country was as follows: Italy 59.90%; France 59.00%; Spain 53.64%; UK 42.50%; Canada 33.50%.

Figure 3. Mean stakeholder estimates of inefficiency values per manufacturer-related implementation challenge



scenario, e.g. from A (SOC, 2022) \rightarrow B (2023) or B (2023) \rightarrow C (2024).

Likelihood there will be more costs associated with a double switch vs. a single switch

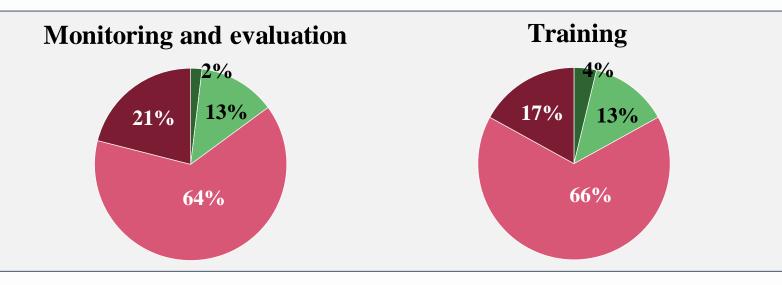
of survey participants (n=53) said the costs associated with vaccine implementation during decisions to switch a vaccine in a NIP were somewhat/very important

increased costs being associated with a double switch vs. a single switch. Figures 4–7 present the findings for individual cost components using the Likert scale below.

For each of the costs, the mean percentages indicated a higher likelihood of

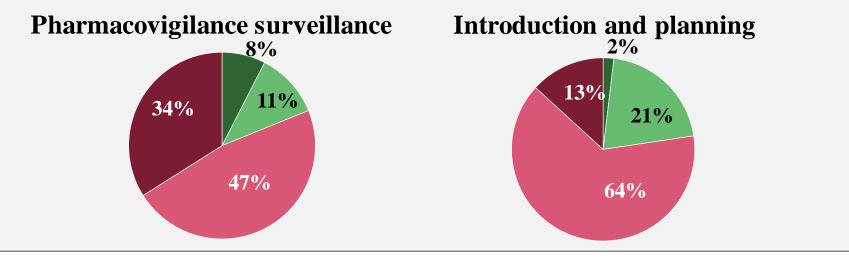
Very unlikely Very likely Likely Unlikely

Figure 4. Percentage likelihood that there will be more monitoring and evaluation, and training costs associated with a double switch vs. a single switch



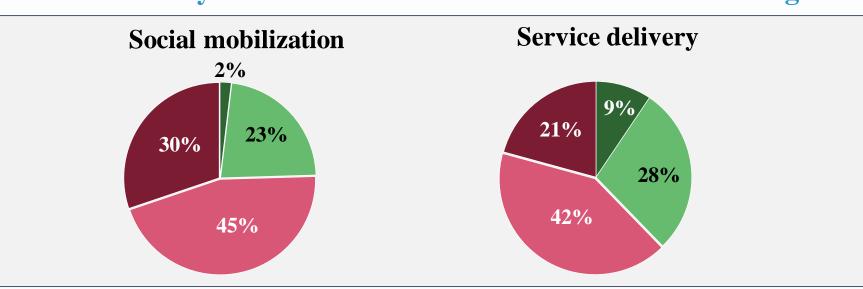
- 85% of participants (n=53) indicated that a double switch would result in a higher likelihood of increased monitoring and evaluation costs (Figure 4).
- 83% of participants (n=53) indicated that a double switch would result in a higher likelihood of increased training costs (Figure 4).

Figure 5. Percentage likelihood that there will be more pharmacovigilance surveillance and introduction and planning costs associated with a double switch vs. a single switch



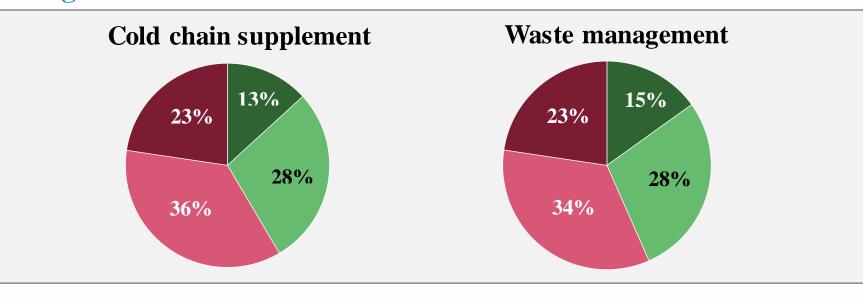
- **81%** of participants (n=53) indicated that a double switch would result in a higher likelihood of increased pharmacovigilance surveillance costs (Figure
- 77% of participants (n=53) indicated that a double switch would result in a higher likelihood of increased introduction and planning costs (Figure 5).

Figure 6. Percentage likelihood that there will be more social mobilization and service delivery costs associated with a double switch vs. a single switch



- 75% of participants (n=53) indicated that a double switch would result in a higher likelihood of increased social mobilization costs (Figure 6).
- 63% of participants (n=53) indicated that a double switch would result in a higher likelihood of increased **service delivery costs** (Figure 6).

Figure 7. Percentage likelihood that there will be more cold chain supplement and waste management costs associated with a double switch vs. a single switch



- **59%** of participants (n=53) indicated that a double switch would result in a higher likelihood of increased cold chain supplement costs (Figure 7).
- 57% of participants (n=53) indicated that a double switch would result in a higher likelihood of increased waste management costs (Figure 7).

CONCLUSIONS

- Most vaccine experts agree that switching vaccines can lead to various implementation challenges, system inefficiencies, and associated costs.
- Implementing an efficient vaccine switch may require consideration of the added benefits of replacing the existing vaccine and implementation challenges.
- Inefficiencies and associated costs may increase when switching vaccines on an NIP twice vs. only once over a short period and between different vaccine manufacturers.
- In situations where multiple vaccines are licensed in short succession, decisions makers might consider waiting to assess vaccines simultaneously for inclusion in NIPs.

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DISCLOSURE

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