Progress Report: E-Labelling of Pharmaceuticals in Malaysia

15 May 2025

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Executive Summary

- **Multi-stakeholder study**: Industry, HCPs, regulators and public
- Strong support for e-labelling due to:
  - **Environmental impact**
  - **Ease of updates**
  - **Improved information accessibility**
- Industry supports NPRA's **QUEST3+** as a centralized, neutral platform, **phased or voluntary rollout**, with expansion to **OTCs and supplements**
- Among HCPs:
  - ~80% open or willing to adopt
  - Over 50% unfamiliar or inexperienced
- Public:
  - 92.8% willing to use e-labelling
  - Key concerns: digital literacy, internet/device access, privacy
- Target completion: **2026**

Industry Insights

Industry Insights

- 10 PRHs from PhAMA (3), MOPI (5), MAPS (2)
- QUEST3+ preferred for *neutrality* and *efficiency*
- **Benefits:** reduced paper, faster variations, simplified logistics
- **Challenges**: ASEAN disharmony, infrastructure gaps, packaging transitions

Industry Insights: Implementation and e-labelling experience

NPRA QUEST3+ system as landing page	• The NPRA QUEST3+ webpage provides a more streamlined post-approval workflow and is easier to maintain than managing individual landing pages hosted by PRHs. • Several participants expressed a preference for *a neutral, regulator-hosted landing page*, noting concerns that company-managed pages could include marketing content. • Drawing from their experience with Singapore's e-labelling model—where each PRH is responsible for developing its own landing page—participants highlighted that this approach adds complexity and requires additional steps during post-approval variation processes.
Post-approval workflow following faster processes compared to traditional post-approval workflow	• All PRHs reported positive experiences with the variation approval process for e-labelling. • One PRH noted that they are able to plan variation submissions with a *one-month buffer*, as approvals are generally granted within 2 to 3 weeks—despite the current limitation that bundle applications are not permitted.

Industry Insights: Implementation and e-labelling experience

Current Malaysia regulatory guidelines self-explanatory but lack ASEAN harmonisation	• Some ASEAN countries—such as Indonesia, Myanmar, and the Philippines—do not currently recognise e-labelling. Brunei is the exception, as it accepts the NPRA Malaysia QR code. • As a result, PRHs must take additional steps, such as preparing separate packaging that includes physical paper leaflets for markets that do not accept Malaysia's e-labelling format. • Most PRHs stressed the need for *regulatory standardization across ASEAN* to *strengthen regional infrastructure* and ensure the *stability and interoperability* of platforms like QUEST3+.
All PRHs agreed that NPRA has been supportive and accommodating toward e-labelling initiatives.	• As Malaysia's national regulatory authority, NPRA has been supportive and has provided a suitable platform to advance e-labelling initiatives. • The establishment of the e-labelling task force—comprising representatives from both government agencies and the PRH associations, in addition of the academia to conduct the independent e-labelling study to gather insights—*reflects NPRA's strong commitment to facilitating the successful implementation of e-labelling in the country.*

Industry Insights: Factors for success and challenges of e-labelling implementation

Success Factors	• Effective *inter-departmental communication* and *well-defined workflows* • Strong regulatory support, backed by existing infrastructure such as 5G internet and the QUEST3+ system • *Valuable learning experiences* drawn from countries with established e-labelling practices, such as Singapore and Japan
Challenges	• *Ongoing availability of paper PI stock*, leading to a 6–12 month overlap period during transition • Miscommunication and unclear execution plans across different levels of the organization • Workflow changes that require adaptation and coordination across departments

Industry Insights: Factors for success and challenges of e-labelling implementation

Observed Benefits	• All PRHs reported a *reduction in paper usage*; however, not all have documented the cost differences before and after implementation. • Reduced paper usage has led to smaller medication packaging, which in turn affects warehouse storage space and logistics • PRHs highlighted *workflow simplification*, particularly the elimination of inserting paper leaflets and the recall process for outdated inserts • Faster dissemination of updated product information was consistently cited, with some PRHs providing specific case examples

Industry Insights: Perceived impact & further opportunities for e-labelling implementation

Handling of Paper Leaflets Request	• Email is the preferred method for handling requests for physical paper inserts, followed by contact through selling agents (SAs). • However, PRHs reported that there have been no significant complaints from healthcare professionals or patients thus far. • SAs have been trained to inform healthcare institutions about the absence of physical leaflets and to guide them on how to access product information via QR code scans. • Additionally, two PRHs emphasized the *need for more systematic information dissemination within healthcare institutions*. They suggested that drug information centres could serve as central points for this purpose. • PRHs also expressed a *strong willingness to support Continuing Professional Education (CPE) activities* focused on medication information retrieval and digital literacy.

Industry Insights: Perceived impact & further opportunities for e-labelling implementation

Handling of special populations	• The quality use of medicines (QUM) should be promoted through *targeted educational activities* aimed at enhancing both health and digital literacy among users. • Several PRHs (particularly those with pharmacists among their teams) highlighted the importance of strengthening QUM efforts through digital channels and educational materials. • Meanwhile, PRHs who are not healthcare professionals emphasized the role of healthcare institutions in *supporting HCPs* - such as community pharmacists and other HCPs—by ensuring they are equipped to guide patients and vulnerable groups in accessing and understanding e-labelling information.

Industry Insights: Perceived impact & further opportunities for e-labelling implementation

Expansion of product categories & voluntary or mandatory status	• All 10 PRHs identified over-the-counter (OTC) products as the next logical category for e-labelling expansion, followed by health supplements. • On the question of whether e-labelling should be voluntary or mandatory, PRHs expressed a range of views (3 categories) • Some supported a mandatory approach, while the majority preferred to keep it voluntary. • A small number remained neutral, indicating that they would comply with any future amendments to the Act and are prepared to proceed should e-labelling become mandatory.

Industry Insights: Perceived impact & further opportunities for e-labelling implementation

Perceived Impact on product e-labelling & Patient's safety	• The availability of online, regularly updated product leaflets has contributed to *improved safety, quality, and efficiency* for both healthcare professionals and patients, primarily by enabling faster access to the latest product information. • One PRH provided a specific example of a product that was previously classified as cold-chain but had its storage condition updated to room temperature—an update that was quickly communicated through the e-labelling platform. • While several PRHs mentioned potential cost savings from reduced paper usage, simplified workflows, and smaller product packaging (which also led to more efficient warehouse storage), *no comprehensive cost analysis* was provided at this stage. • It was noted, however, that not all products experienced a reduction in packaging size.

Industry Insights: Perceived impact & further opportunities for e-labelling implementation

Public/patient readiness and acceptability	• All PRHs agreed that the Malaysian public is generally digitally literate; however, they emphasized *the need to support this observation with evidence.* • In addressing vulnerable populations—such as the elderly, individuals with disabilities, and the deaf-mute community—PRHs highlighted the importance of *empowering caregivers, with strong backing from NGOs* and *the broader healthcare community*. • The need for institutional support was also emphasized, particularly in enhancing both health literacy and digital literacy to ensure equitable access to e-labelling information across all segments of the population.

Summary: Industry Insights on E-Labelling

- **Regulatory Support & Collaboration**
  - Strong endorsement from NPRA and use of QUEST3+ as a centralized platform
  - Formation of e-labelling task force with government and industry representatives, independent study to gather insights by the academia
- **Perceived Benefits**
  - Reduced paper use and packaging size
  - Simplified workflow (e.g., removal of leaflet insertion and recall processes)
  - Improved post-approval variation timelines and warehouse efficiency
- **Implementation Experience**
  - All PRHs report positive variation approval experiences (typically 2–3 weeks)
  - Real-time updates used in product reclassification (e.g., cold-chain to room temp)
  - Ongoing cost tracking by several PRHs

Summary: Industry Insights on E-Labelling

- **Challenges & Limitations**
  - Lack of ASEAN regulatory harmonization
  - Overlap of physical packaging in non-recognizing countries
  - Internal miscommunication and digital infrastructure limitations in some companies
- **Future Directions**
  - Strong support for inclusion of OTCs and supplements
  - Mixed views on mandatory rollout; most support voluntary with readiness to comply
  - Willingness to support institutional education (e.g., CPE for HCPs)
  - Emphasis on role of HCPs and institutions in reaching vulnerable populations

HCPs Insights

Healthcare Professional Insights

171 Respondents

Majority Pharmacists
49.7% with 11–20 years experience

Top Benefits

109 Faster Updates

106 Environmental Impact

100 Accessibility

Top Challenges

111 Patient Resistance

75 Tech Barriers

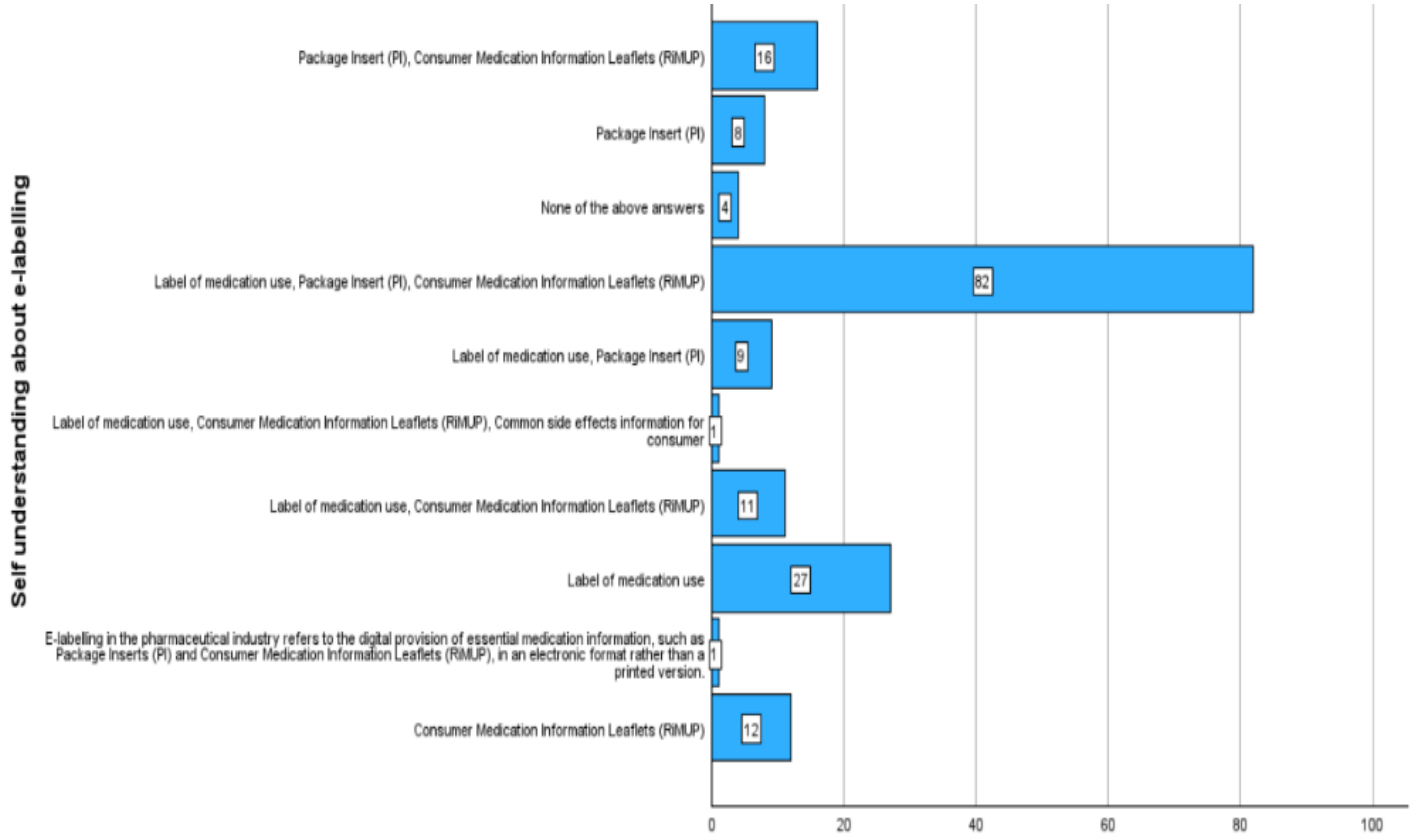
68 Workload

Adoption Readiness

80% willing or conditionally willing

20% not yet willing

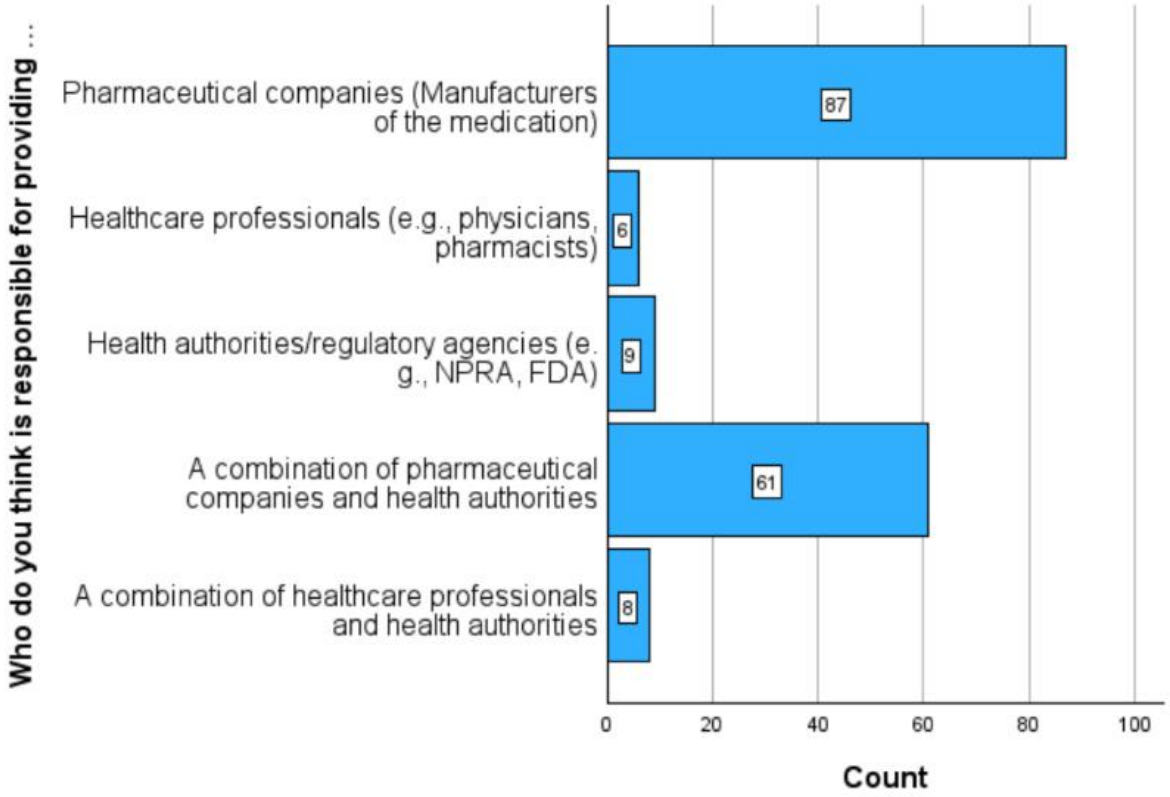
Healthcare Professional Insights



- 56.4% reported being unfamiliar with the concept of e-labelling
- Among those who are familiar, the primary source of information - colleagues, previous use and media sources.
- Most healthcare professionals understood e-labelling as referring to medication use instructions, PIs, and RiMUP.

Healthcare Professional Insights

- **Understanding and Trust**
- When asked who should be responsible for providing the content of electronic product information (ePI);
  - 51% respondents identified *pharmaceutical companies* (i.e., medication manufacturers) as the responsible body.
  - Another 36% respondents believed that responsibility should be shared between pharmaceutical companies and health authorities

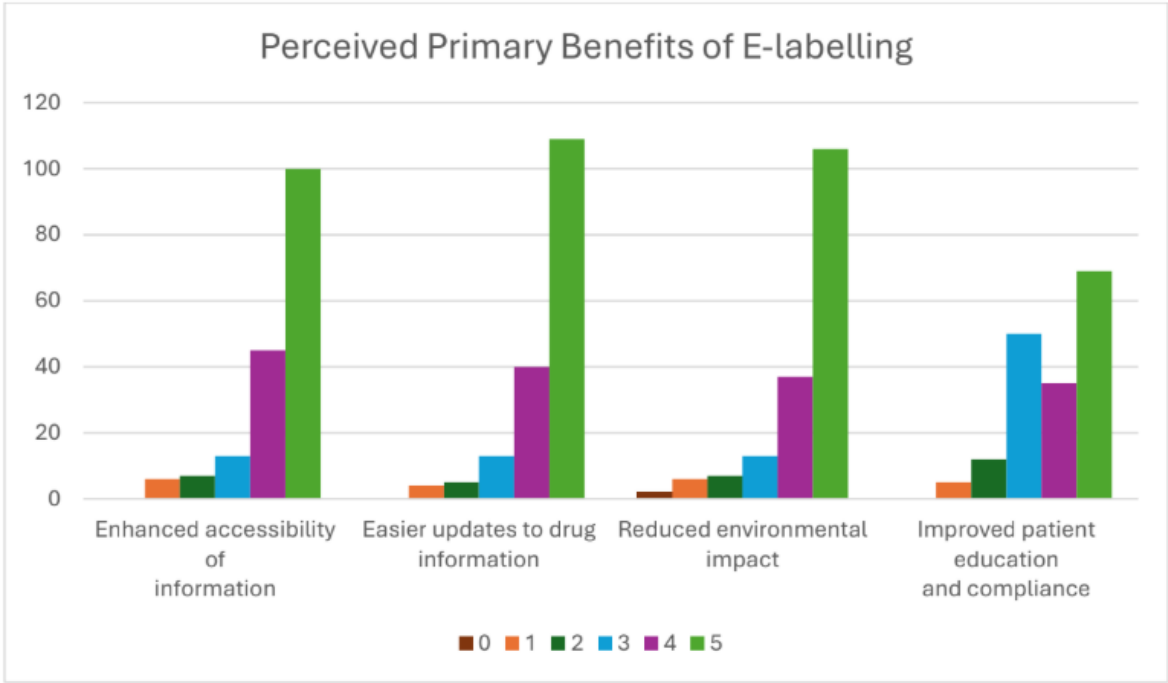


Healthcare Professional Insights

Perceived Benefits of E-Labelling (HCPs)

- **Easier updates to drug information** (109 respondents rated 5/5)
- **Reduced environmental impact** (106 respondents rated 5/5)
- **Improved accessibility to information** (100 respondents rated 5/5)
- **Improved patient education and compliance** also rated positively, though with more varied responses
- Overall: Strong support for the **practical and ecological value** of e-labelling

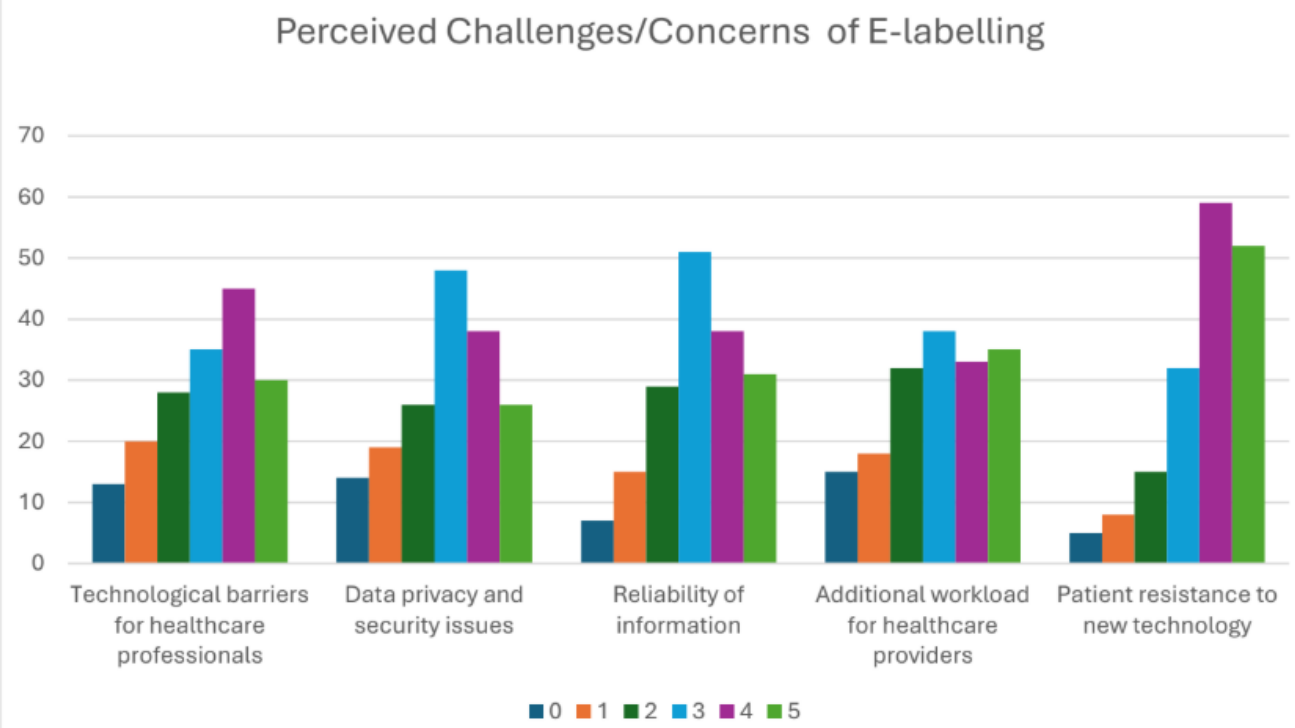
- **Perceived benefits:**



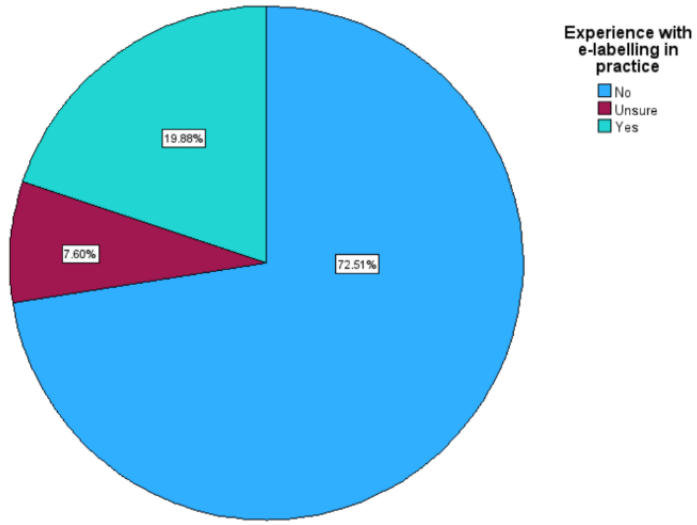
Healthcare Professional Insights

Perceived Challenges/Concerns

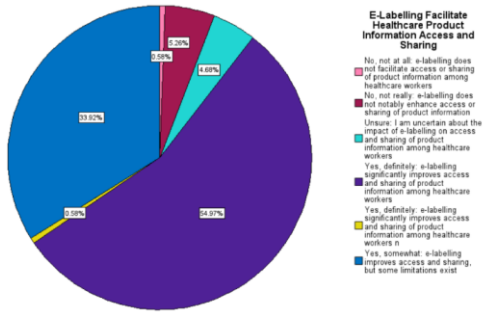
- **Top concerns:**
  - **Patient resistance to technology** (59 rated 4, 52 rated 5 – highest concern)
  - **Technological barriers for HCPs** (>70 rated 4 or 5)
  - **Increased workload for providers** (>70 rated 4 or 5)
- **Moderate concerns:** Data privacy and security



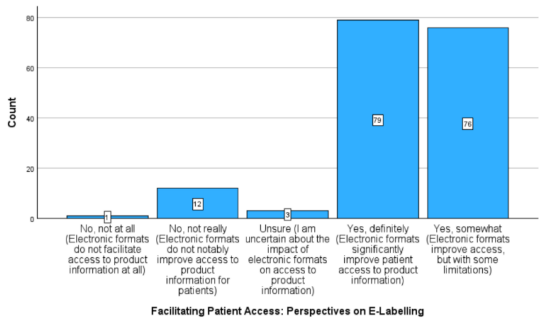
- **Use of e-labelling in practice:**



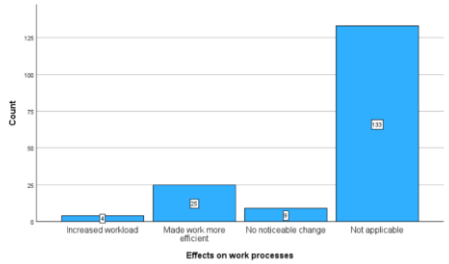
- **Effect on communication and access among HCPs:**



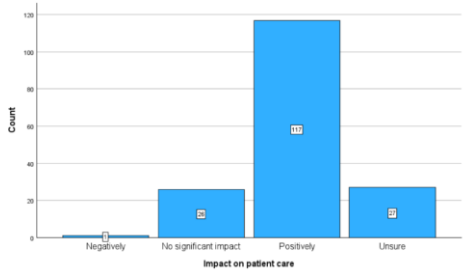
- **Effect on patient access:**



- **Effects on work processes:**



- **Impact on patient care:**



Healthcare Professional Insights

Impact of E-Labelling on Practice (HCPs)

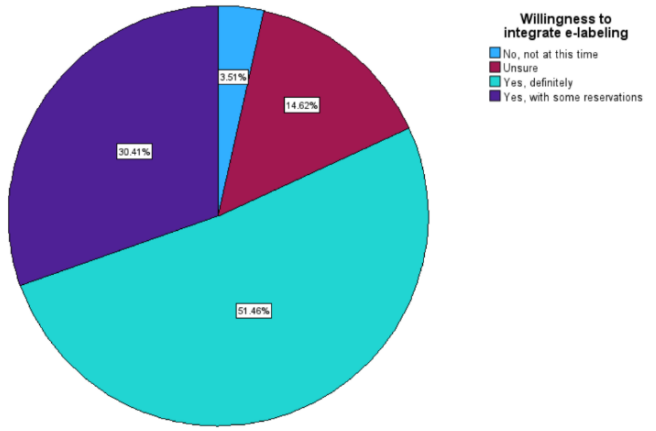
- **91%** agreed e-labelling improves patient access
- **55%** agreed that e-labelling significantly improves access as haring of product information among HCPs
- Only 19.88% have used e-labelling in practice; **73%** have not
- **Impact on workflow –** 78% respondents noted no impact on work processes
- **68%** agreed e-labelling positively impacts patient care

Healthcare Professional Insights

Willingness to Integrate E-Labelling (HCPs)

- **52%** willing to integrate into practice
- **30.4%** open with some reservations
- **3.51%** not supportive at this time

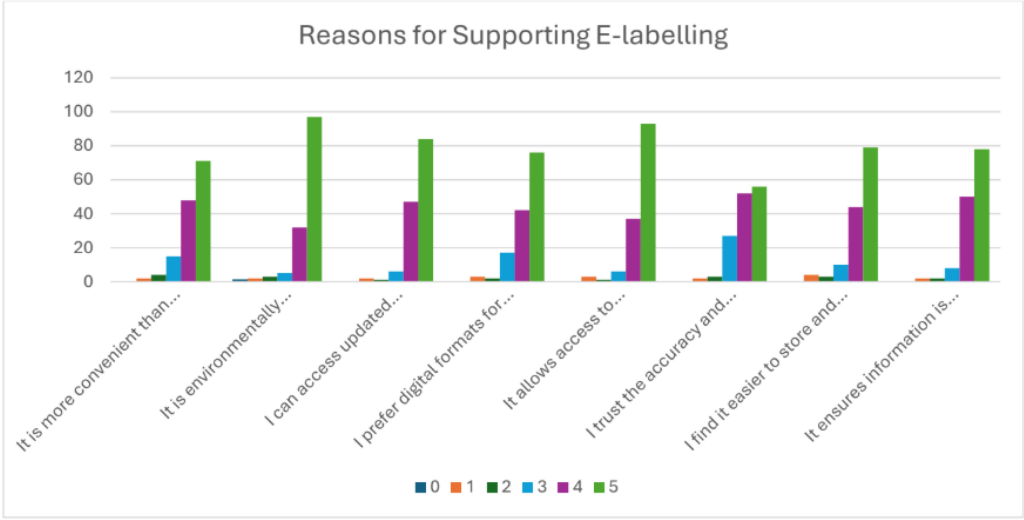
- **Willingness to integrate e-labelling:**



Top Reasons for Supporting E-Labelling

- Environmental friendliness
- Easy access to updated information
- Access to additional resources (videos, FAQs)
- Other reasons: Greater convenience, better searchability than printed materials

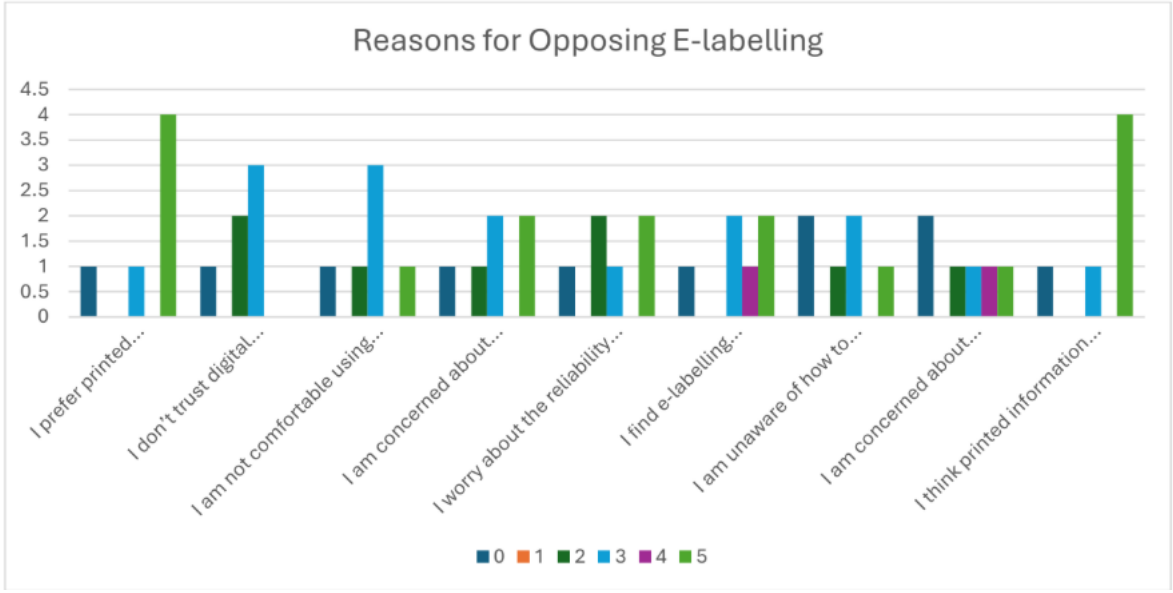
- **Reasons for supporting/opposing:**



Healthcare Professional Insights

Top Reasons for Opposition (low response overall)

- Preference for printed labels (4 respondents rated 5/5)
- Distrust in digital platforms
- Discomfort with using technology
- Concerns over internet/data access
- Lack of knowledge on how to use/access e-labelling



Overall: Opposition was minimal compared to strong support for integration.

Summary of Preliminary Findings (HCP Perspective)

- **General outlook** toward e-labelling is positive, but **overall readiness remains moderate**
- Over **50% unfamiliar** or inexperienced, yet **~80% are open or willing** to integrate in future
- **Respondent profile:**
  - Mostly **pharmacists**
  - **49.7%** have 11–20 years of experience (mid-career professionals)
  - Majority from **government hospitals/clinics**, especially in **Selangor**
- **Top-rated benefits**:
  - **Easier updates to drug information** (109 respondents)
  - **Reduced environmental impact** (106)
  - **Enhanced accessibility** (100)
  - Positive ratings also for **patient education and compliance**, though with more varied views
- Overall, findings reflect **strong support for the practical and ecological value** of e-labelling

Preliminary Observations

Top Concerns Among HCPs

- **Patient resistance to technology** was the most agreed concern
  - 59 respondents rated it 4; 52 rated it 5
- **Technological barriers** for HCPs and **additional workload** also rated highly
  - Both received **70+ responses** at levels 4 or 5
- **Moderate concerns**:
  - Data privacy and security
  - Reliability of information

Willingness to Integrate E-Labelling

- **50%** willing to integrate into practice
- **30.41%** open with some reservations
- **3.51%** opposed integration at this time

Top Reasons for Supporting E-Labelling

- **Environmental friendliness** (97 respondents rated 5/5)
- **Access to updated information** (84 respondents)
- **Availability of additional resources** (e.g. videos, FAQs) – 93 respondents
- Other widely supported reasons:
  - Greater **convenience** over printed materials
  - **Better searchability** in digital formats

Preliminary Observations

Reasons for Opposing E-Labelling (Minimal Responses)

- **Preference for printed labels/inserts**
- **Distrust in digital platforms** for medical information
- **Discomfort with using technology**
- Some concerns about:
  - **Internet/data access**
  - **Uncertainty on how to use/access e-labelling**

- *Overall: These concerns were **minor compared to the strong overall support***

Public Insights

Public Insights: Summary of Public Awareness and Perception of E-Labelling

Awareness:

- Only **45.5%** had heard of e-labelling prior to the survey
- Awareness was mostly acquired through **social media**, **pharmacies**, and **media outlets**

Usage and Willingness:

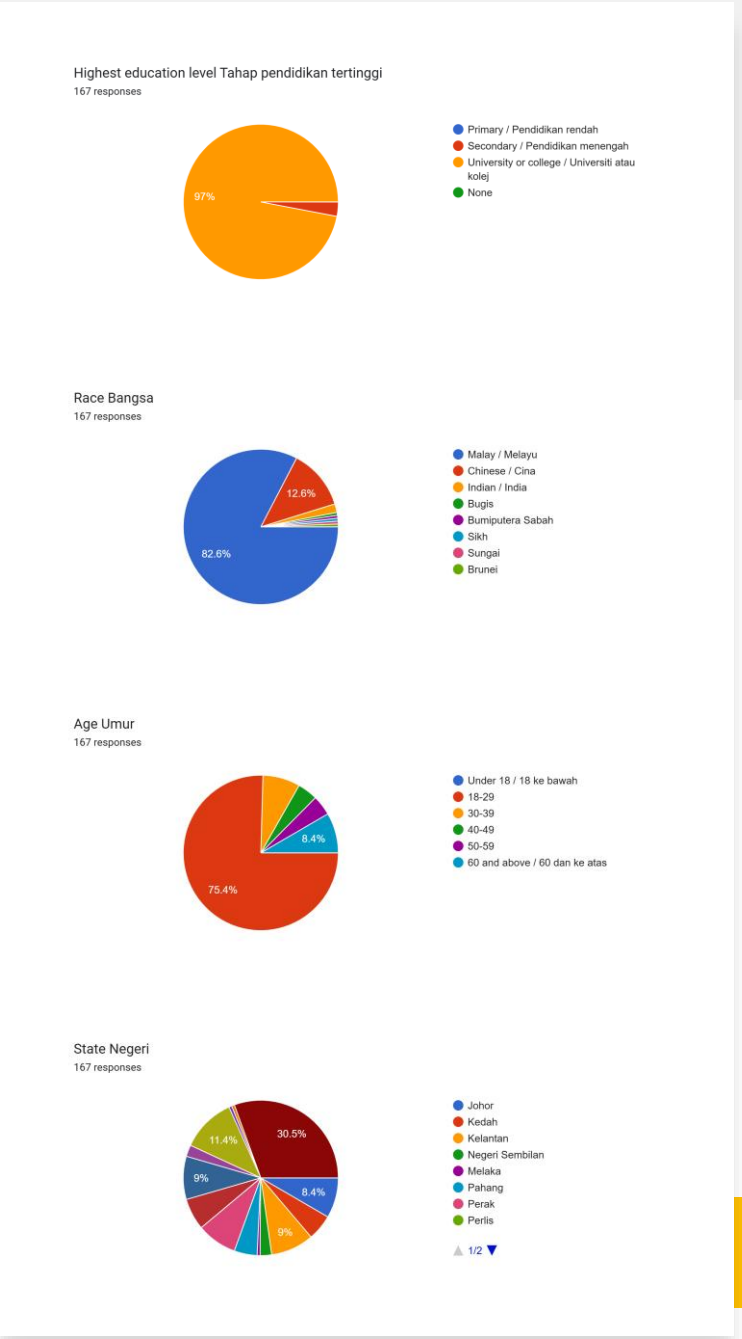
- Only **12.6%** had used e-labelling
- However, **92.8%** were definitely or probably willing to use it if available

Willingness was driven by benefits such as **updated information**, **environmental impact**, and **digital convenience**

Perceived Benefits:

- **85%** cited timely access to information as the top benefit
- Other major benefits included **environmental savings**, **ease of use for tech-savvy users**, and **medication safety**

- **Concerns:**
  - Main challenges were data privacy, digital literacy, device and internet access, and accessibility for vulnerable groups
- **Enablers for Readiness:**
- Public readiness could be strengthened through:
  - HCP support (66.5%)
  - Tutorials and training (61.7%)
  - Assurance of privacy/security (59.9%)
- **Medication Adherence:**
- 65.9% believed e-labelling could improve adherence
- Key mechanisms included:
  - Easier access to instructions
  - Clearer understanding of side effects/interactions



Public Insights: Demographics

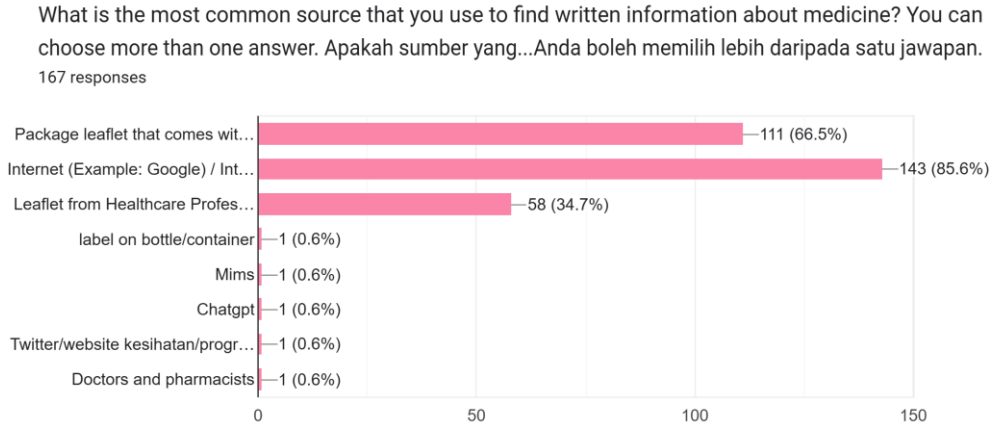
- **Age Distribution**
- Majority of respondents (75.4%) were aged 18–29 years
- Very limited participation from older adults, including those aged 60 and above (8.4%)
- **Ethnicity**
- Malay respondents made up 82.6%, followed by Chinese (12.6%), with other ethnic groups minimally represented
- **Geographical Coverage (State)**
- Responses were most concentrated in Kedah (30.5%)
- Other states like Johor, Perak, and Melaka were represented, but East Malaysia and smaller states had little to no coverage
- **Education Level**
- 97% of respondents had university or college education
- Very few had only secondary education or none at all

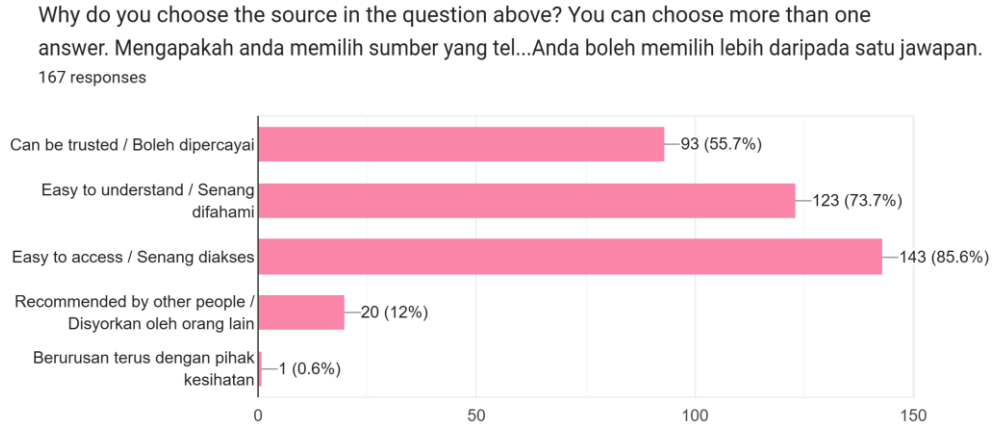
***Note on Representativeness**

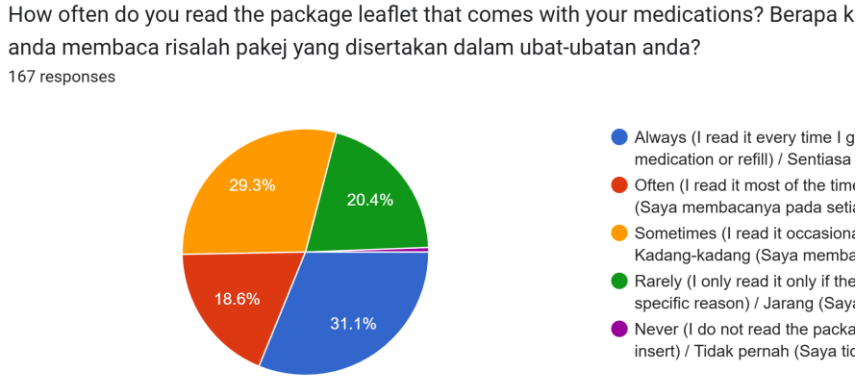
- The current public survey sample **does not fully reflect the demographic diversity of Malaysia**.
- Key population groups are underrepresented, particularly: **older adults**, **ethnic minorities, respondents from East Malaysia and smaller states** and i**ndividuals with lower education levels**
- These limitations suggest that while preliminary insights are valuable, further data collection is needed to ensure **equity and generalizability** in shaping e-labelling policy and implementation strategies.

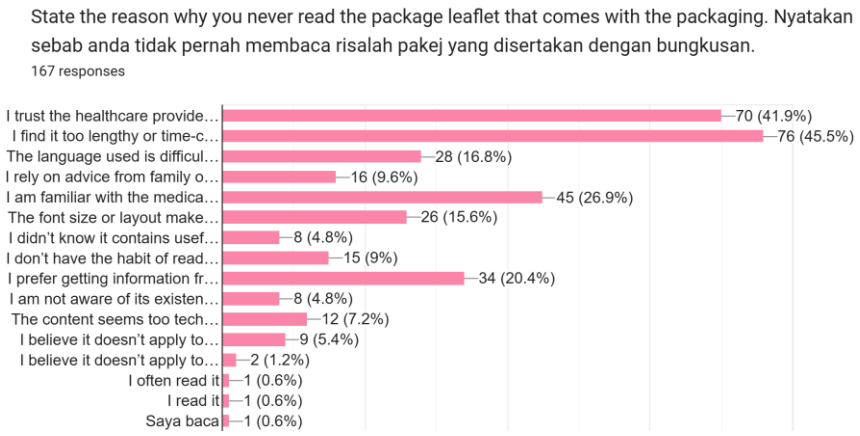
Public Insights: Awareness and General Knowledge to Assess Medicine Information

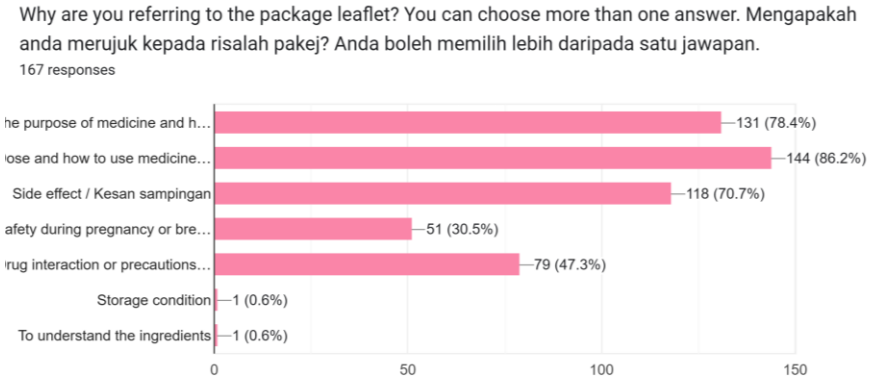
- The **internet (e.g., Google)** was the most frequently used source for written medicine information, selected by **85.6%** of respondents.
- This was followed by **package leaflets** that come with medicines (**66.5%**) and **leaflets from healthcare professionals** (**34.7%**).
- Other sources such as MIMS, labels, or advice from HCPs were rarely selected (<1%).
- When asked why they chose their preferred source, the top three reasons were:
  - **Ease of access** (85.6%)
  - **Ease of understanding** (73.7%)
  - **Trustworthiness** (55.7%)
- Social recommendations and direct engagement with healthcare providers were cited much less frequently.











Public Insights: Awareness and General Knowledge to Assess Medicine Information

Public Engagement with Package Leaflets (n = 167)

Reading Frequency

- **31.1%** of respondents *always* read the leaflet when receiving a new medicine
- **29.3%** read it *sometimes*, while **20.4%** read it *rarely*
- **18.6%** reported reading it *often*
- Indicates moderate engagement, with a significant portion referring to leaflets only occasionally

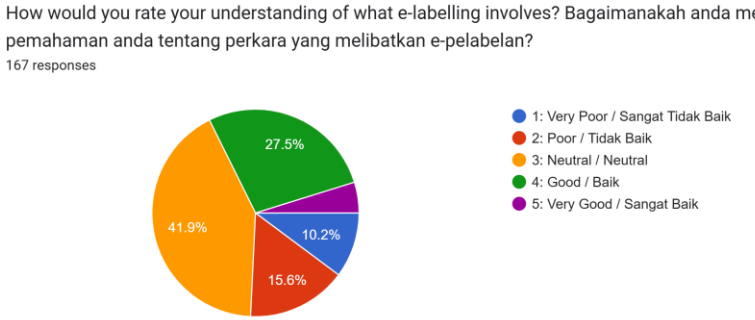
Top Reasons for Referring to Package Leaflets

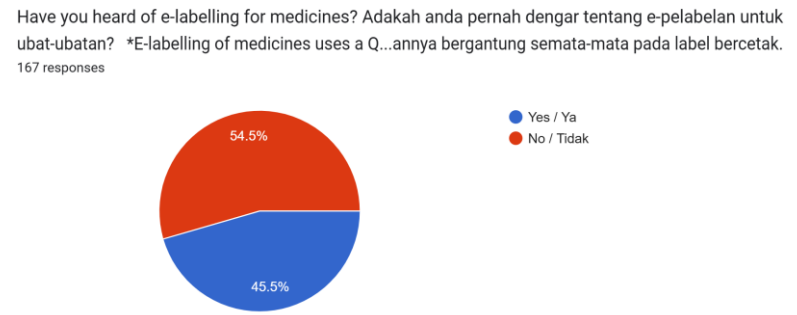
- **Dose and usage instructions** – 144 respondents (86.2%)
- **Purpose of the medicine** – 131 (78.4%)
- **Side effects** – 118 (70.7%)
- Other reasons: precautions/interactions (47.3%), pregnancy safety (30.5%)

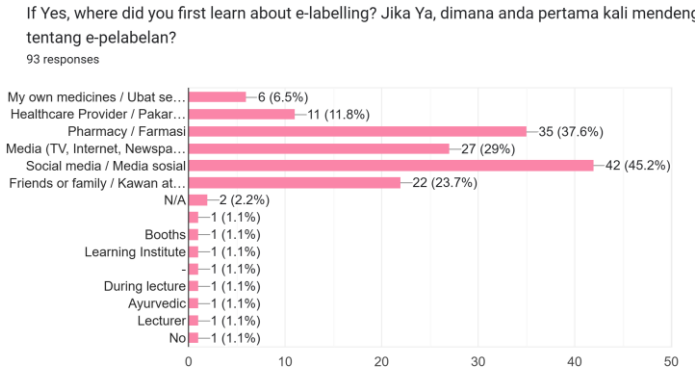
Top Reasons for Not Reading Leaflets

- **Too long or time-consuming** – 76 respondents (45.5%)
- **Trust in HCPs' verbal explanation** – 70 (41.9%)
- **Prefer to get information directly from HCPs** – 34 (20.4%)
- Others: difficult language (16.8%), unfamiliarity with the medicine (26.9%), small font/layout issues (15.6%)
- *While most respondents engage with package leaflets at some level, **barriers such as complexity, time constraints, and trust in verbal sources** reduce full utilization.*
- *These insights highlight the need for **simplified, accessible, and digital-friendly formats** to enhance medicine information use—supporting the rationale for e-labelling.*

Public Insights: Awareness and General Knowledge of E-Labelling



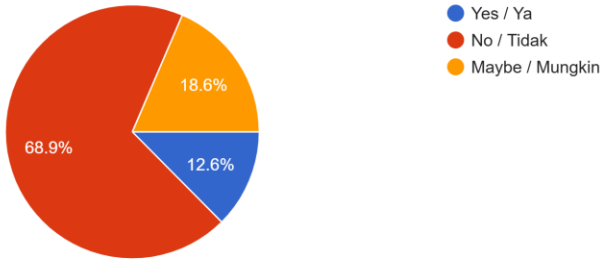




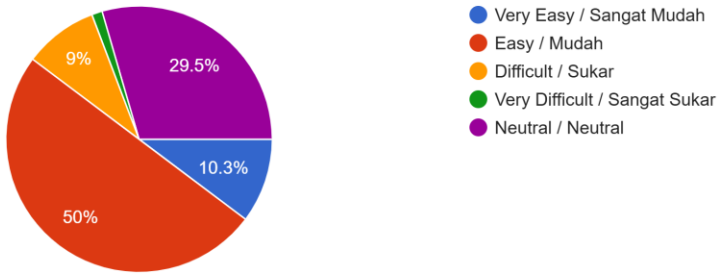
- **Awareness of E-Labelling**
  - Only 45.5% of respondents have heard of e-labelling for medicines
  - A larger portion (54.5%) are not yet aware—indicating a significant awareness gap among the public
- **Where Did They First Hear About E-Labelling? (n = 93 who said "Yes")**
  - Social media – 42 respondents (45.2%)
  - Pharmacies – 35 respondents (37.6%)
  - Mainstream media (TV, Internet, newspapers) – 27 respondents (29%)
  - Friends or family – 22 respondents (23.7%)
  - Other sources (HCPs, lectures, booths, etc.) were each below 12%
- *Despite willingness to adopt e-labelling, public knowledge remains limited, with most learning about it through social media and pharmacies*
- *Emphasizes the importance of targeted awareness campaigns via trusted healthcare settings and digital platforms*

Public Insights: Perceptions and Attitudes Towards E-Labelling

Have you ever used e-labelling for medicines? Pernahkah anda menggunakan e-pelabelan untuk ubat-ubatan?
167 responses



If Yes, how easy was it to use the e-labelling system? Jika Ya, bagaimana mudahkah menggunakan sistem e-pelabelan?
78 responses



Public Experience with E-Labelling

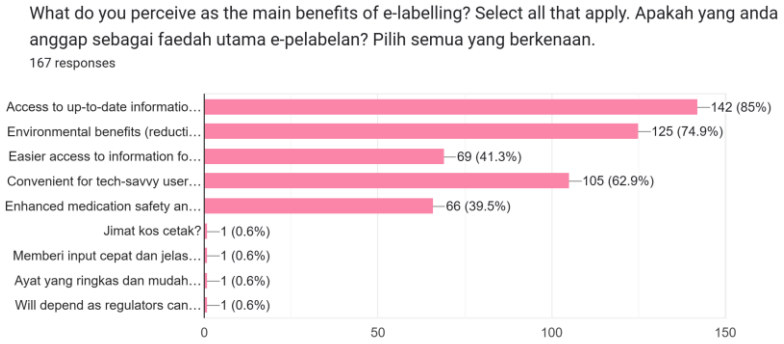
Usage Experience

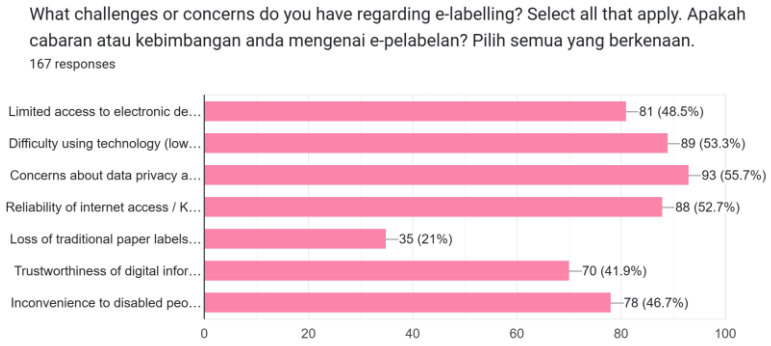
- Only **12.6%** of respondents have ever used e-labelling for medicines
- **68.9%** have never used it
- **18.6%** were unsure or responded “maybe”
  → Indicates that **real-world exposure to e-labelling remains low** among the public

Ease of Use (among 78 users)

- **50%** found it *easy* to use
- Only **10.3%** found it *very easy*
- **29.5%** remained *neutral*
- A small proportion found it *difficult (9%)* or *very difficult (1%)*
  → Suggests that once accessed, the system is **generally usable**, but not yet **intuitive or seamless** for all users
- *Low usage rates despite high willingness highlight a **need for improved exposure and education***
- *Moderate ease-of-use feedback signals opportunities to enhance **user interface, guidance, and onboarding** for broader acceptance*

Public Insights: Perceptions and Attitudes Towards E-Labelling





Top Perceived Benefits

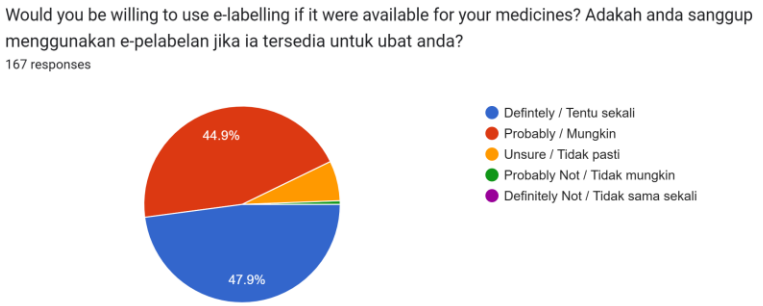
- **Access to up-to-date medication information** – 85%
- **Environmental benefits** (e.g., paper reduction) – 74.9%
- **Convenience for tech-savvy users** 62.9%
- **Easier access for visually impaired individuals** – 41.3%)
- **Enhanced safety and adherence** –39.5%

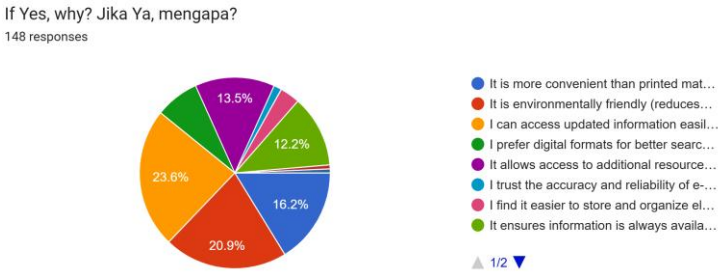
Top Concerns and Challenges

- **Data privacy and security** –55.7%
- **Difficulty using technology / low digital literacy** –53.3%
- **Unreliable internet access** –52.7%
- **Limited access to electronic devices** –48.5%
- **Inconvenience to persons with disabilities** –46.7%
- **Trustworthiness of digital information** –41.9%
- **Loss of printed labels** –21%

- *While the majority see **e-labelling as beneficial**, particularly for timely access to information and environmental reasons, concerns remain around **digital access, literacy, and trust**—especially among vulnerable populations.*
- *These findings reinforce the need for **hybrid access models**, **privacy safeguards**, and **public education** to support equitable e-labelling adoption.*

Public Insights: Readiness and Acceptance





Willingness to Use E-Labelling

- **47.9%** would *definitely* use e-labelling if available
- **44.9%** would *probably* use it
- Only a small fraction were unsure, unlikely, or unwilling
- → **Over 92%** of respondents show a **positive or conditional inclination** toward e-labelling adoption

Top Reasons for Willingness (n = 148 respondents)

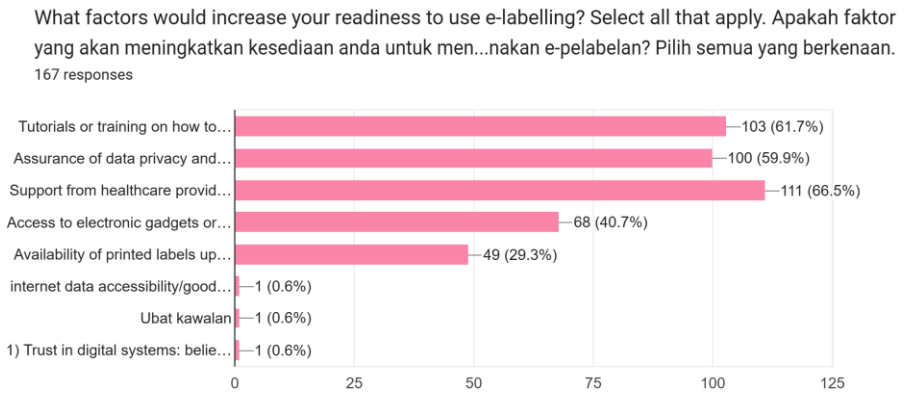
- Access to updated information
- Environmentally friendly
- Convenience over printed materials
- Preference for digital formats and ability to access additional resources (e.g. videos, FAQs)
- Trust in accuracy and ease of storing/searching information

Top Reasons for Reluctance (n = 65 respondents who were unsure/unwilling)

- **Preference for printed labels/inserts** (24.6%)
- **Lack of trust** in digital platforms for health information
- **Technology discomfort** and concerns over **internet/data access**

- *Concerns about **privacy**, **reliability**, and **difficulty accessing or navigating** e-labelling systems*
- *The public shows **strong openness** to adopting e-labelling, supported by environmental, informational, and usability benefits*
- *However, **familiarity with technology, trust in digital systems, and personal habits** continue to shape acceptance*
- *These insights support the need for a **dual-access strategy**, user training, and trust-building measures to ensure inclusive implementation*

Public Insights: Readiness and Acceptance



Top Enablers Identified:

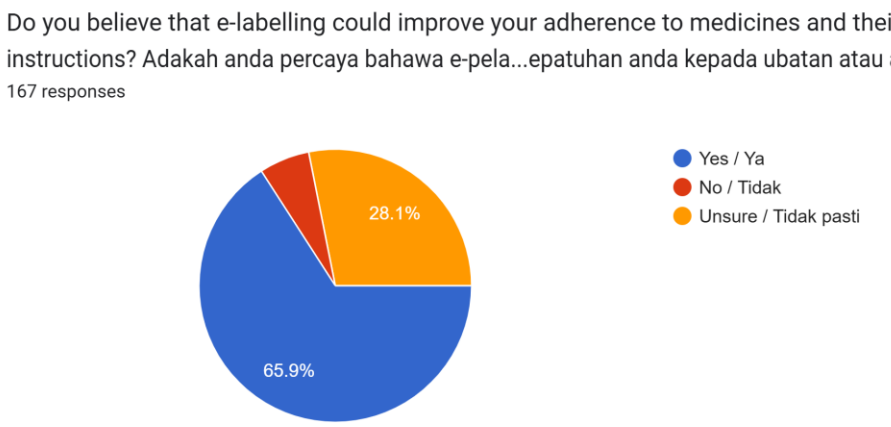
- **Support from healthcare providers** – 111 respondents (66.5%)
- **Tutorials or training on how to use e-labelling** – 103 respondents (61.7%)
- **Assurance of data privacy and security** – 100 respondents (59.9%)
- **Access to electronic gadgets or kiosks** – 68 respondents (40.7%)
- **Availability of printed labels upon request** – 49 respondents (29.3%)

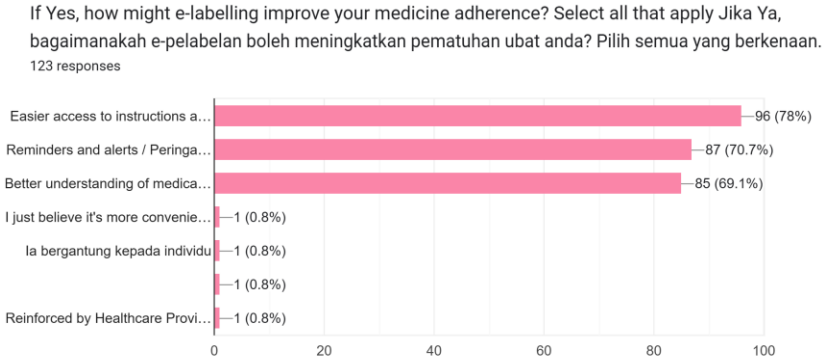
Minimal Mentions:

- Good internet accessibility
- Controlled medicine (ubat kawalan) regulation
- General trust in digital systems

- *Readiness to adopt e-labelling can be significantly enhanced through provider engagement, training, and privacy assurance*
- *Device access and print-on-demand options remain important for inclusive implementation, especially for vulnerable or digitally challenged users*

Public Insights: Impact on Medicine Adherence and Compliance





- **65.9%** of respondents believe that e-labelling could help improve their adherence to medications
- **28.1%** were unsure, while only **6%** disagreed

Among those who believed it could improve adherence (**n = 123**):

- **78%** cited **easier access to instructions and dosage information**
- **70.7%** indicated that **reminders and alerts** would support better adherence
- **69.1%** believed it would lead to a **better understanding of side effects and drug interactions**

- *The majority of respondents recognize the **potential of e-labelling to enhance adherence**, particularly through improved clarity, accessibility, and digital functionalities.*
- *These insights suggest that integrating **user-friendly features** into e-labelling systems could directly support **safer and more informed medicine use**, especially for long-term therapy.*

Public Insights: Additional comments or concerns about e-labelling.

- *“Difficult to be accessed by elderly”*
- *“Data mudah dijual oleh scammer”*
- *“Security - possibility of being hack. Was it being monitored by regulated body to ensure the data is correct and accurate at ALL TIME”*
- *“Jika maklumat tidak dberikan dengan baik, pesakit mungkin akan kekurangan atau terlebih dos ketika ambil ubat”*
- *“In case of emergency and there is no internet? E-labelling becomes useless”*

Preliminary Observations

- The Malaysian public demonstrates **willingness** and **positive perception** toward e-labelling despite limited prior experience.
- The findings suggest a clear opportunity for national rollout, provided that key barriers—such as **digital access, literacy, and trust**—are addressed through **education, inclusive design, and hybrid access models** (e.g., optional printed labels).
- Strategic support from healthcare providers and regulators will be essential to ensure equitable and effective implementation.

Limitations and Next Steps

Limitations

- The current analysis remains limited by insufficient demographic representation, particularly among private sector healthcare professionals and vulnerable populations.
- Vulnerable communities—including the elderly, persons with disabilities, and those with low digital access—remain underrepresented.

Next Steps (Ongoing)

- **Expand data collection** to cover underrepresented segments, including private sector HCPs, older adults, and digitally marginalized groups.
- **Stratify analysis** by sector, age group, digital proficiency, and geographic location to assess readiness more accurately.

Thank You