

RhinoStics Overview Presentation

Revolutionizing Sample Collection Test Workflows



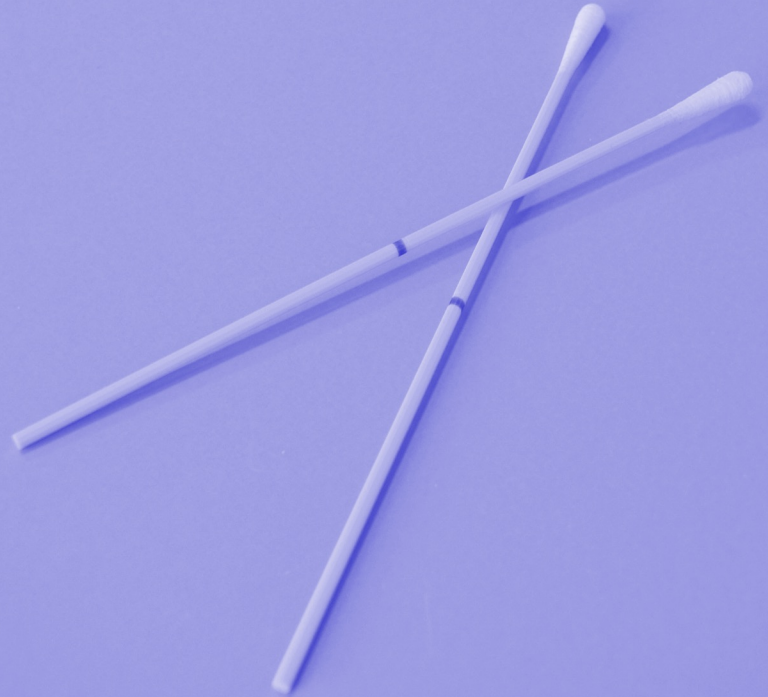
Innovation in Diagnostic Lab Workflows is Long Overdue

- Swab and other manual medical device-based assay workflows are inefficient, adding costs and creating bottlenecks for the millions of diagnostics tests run globally
- During the pandemic, testing demand significantly exceeded output. Temporary measures, including short-term labor and other non-scalable solutions, were costly and inefficient stopgaps.
- Manual processing workflow inefficiencies are particularly noteworthy and spread well beyond COVID:
 - Genomic testing using buccal swabs
 - Blood
 - STD testing via vaginal, penile, anal, and cervical swabs
 - Respiratory panel testing & MRSA presurgical screening
 - Future pandemic prep (COVID variants, bird/swine flu)
 - Applied markets










Yesterday's Swab Designs are Hampering Productivity

- ❖ Swab designs have remained unchanged for decades: one material (swab head) assembled around a second material (stick)
- ❖ Sample may be retained in swab head during elution steps
- ❖ Use of viral transport media (VTM) often necessitates concentration steps, incurs risks of biohazard exposure and cross-contamination, and may interfere with PCR reagents
- ❖ Limited global manufacturers with limited production scalability



Crisis Created Opportunity

-  Drive efficiencies – automated swabs drop laboratory labor costs by 90% (to <\$0.50 per assay)
-  Bypass traditional swab manufacturing methods and supply channels
-  Streamline accessioning and decapping steps to accommodate high-volume test demands and surges
-  Reduce hands-on labor requirements and labor-related injury/biohazard risks
-  Increase collection yield and processing consistency
-  Eliminate costs, biohazard risks, and assay interference associated with VTM
-  Growing self-collection and telehealth tailwinds



Rhinostics: Driving Swab and Sample Collection Device Efficiencies

- ❏ Harvard spin-out, IP protected technology
- ❏ Novel purpose-built approach to swab and other sample collection formats
- ❏ Automatable solution driving efficiency and safety for testing laboratories
- ❏ New materials for dry collection that impacts and improves assay performance
- ❏ Experienced executive and board of directors with rapid execution in first 16 months



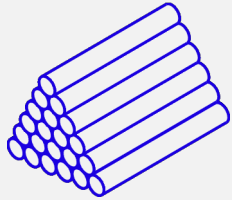
Company Mission Statement: Distilling Team Input

❖ Rhinostics fearlessly strives to improve and speed diagnostic testing through innovation, bringing new purpose-built solutions to elevate sample quality and workflows on a global basis.

❖ By removing these bottlenecks, we save lives and better human health, and by removing costs, make diagnostic testing benefits available more broadly around the world.

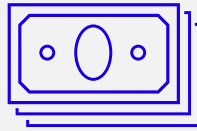


Rhinostics Uses Automation to Solve these Problems



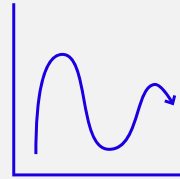
Labor

Instantly scale to meet surging demands without increasing lab personnel



Costs

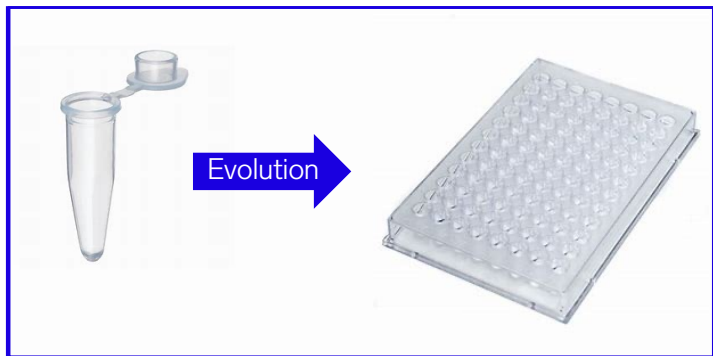
Reduce time and workflow steps as well as related consumables, eliminate VTM



Results Integrity

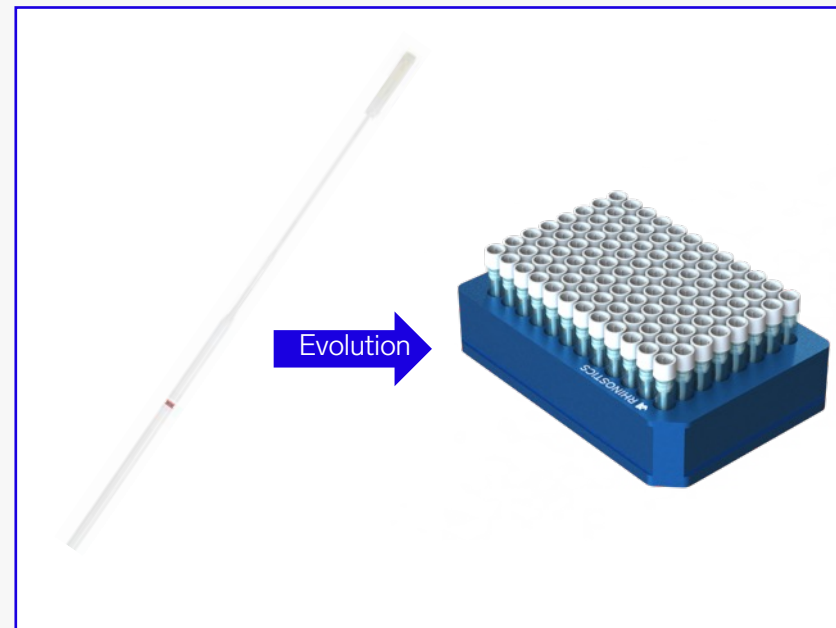
Eliminate user variability, reduce sample loss during extraction/concentration steps, enhance sample tracking

Automation: Proven, with Room for Perfection



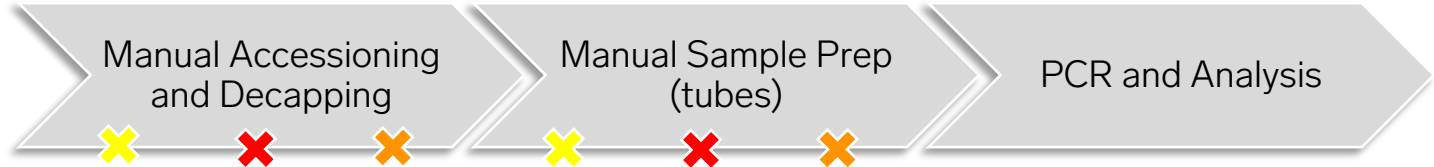
- ❧ The multi-billion dollar laboratory automation industry is enabled through microplate use
- ❧ Automated microplate-based workflows enable miniaturized assays, consistent performance, and faster/more efficient processing, *however...*
- ❧ Microplate use in the workflow middle highlighted bottlenecks at the beginning

Elegant Rhinostics solutions are intentionally built to significantly break bottlenecks at the beginning of workflows during a crisis and beyond

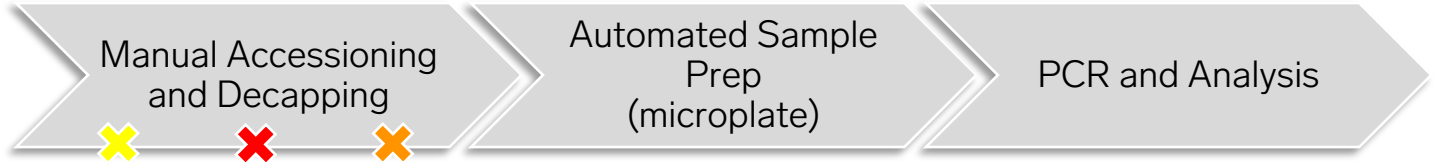


Rhinostics is Driving Sample Collection Device Workflow Evolution

Yesterday



Today – The Revolution Begins



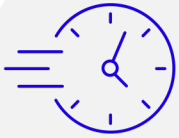
Tomorrow – Revolutionary Change Takes Hold



Disruptive Pain Points

- ✕ Throughput
- ✕ Quality
- ✕ Personal Risk

The Rhinostics Solution

**Fast and simple**

Simple, rapid, comfortable collection from nostril

**Automation**

Automatable for decapping and resuspending sample

**Dry logistics**

Dry, protected sample transportation

**Simple buffers**

Polypropylene material allows easy release of viral material in low volumes of simple buffers

**Efficiency**

Brings efficiency, labor savings, safety to laboratories

**Concentration**

30x increased concentration for reliable results

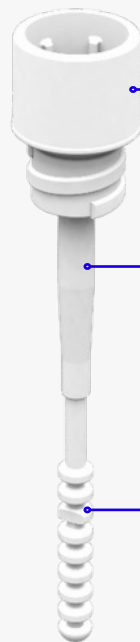
RHINOstic® Automated Swab

Dry transport and hydrophobic materials enable 30X sample concentration compared to traditional swabs transported with VTM

Side barcode for patient phone app and redundant manual scanning



Bottom 2D barcode for automated 96-unit rack accessioning using RHINOrac and robotic device



Automated decapper-compatible

Easy to manufacture
injection molded polypropylene
swab integrated with cap

Stacked ring head design, validated
in laboratory and clinical studies,
enables comfortable sample
collection from the anterior nares
with high collection capacity

VERIstic™ Collection Device

AVAILABLE ~4Q22

Flexible for use with blood and other small volume biological fluid collection applications

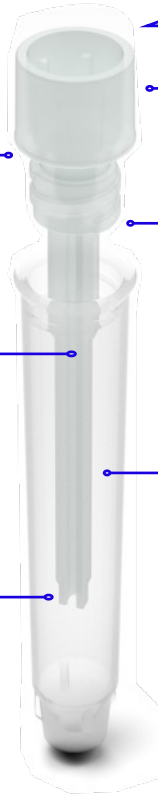
All-in-one compact design replaces blood filter paper collection— simply collect, ship in the tube, and process in an automated lab workflow

Tried and true self-metered wicking collects approximately 50 μ L of sample

Automated decapper-compatible

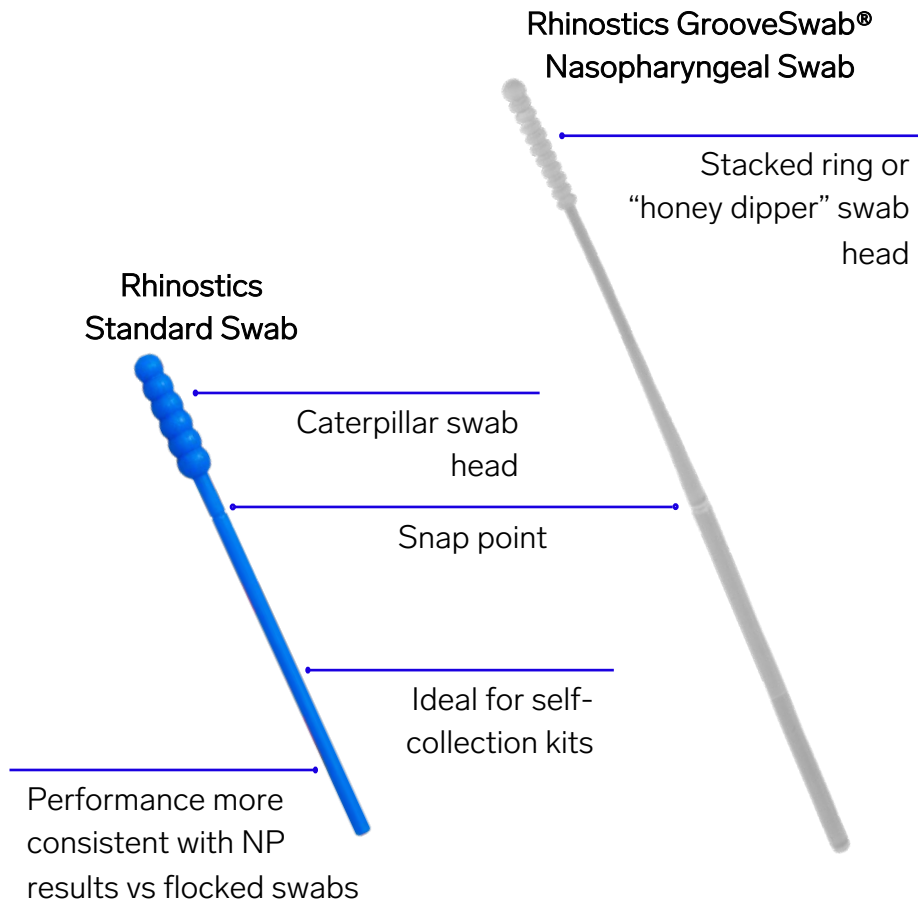
Easy to manufacture injection molded collection device integrated with cap

Purpose-built 3-sided capillary design enables comfort, rapid, efficient collection, and full elution in the lab



Not Quite Ready for Automation?

- ❖ Injection molded polypropylene ensures comfortable collection
- ❖ Snap point facilitates compatibility with cryovials or other collection/transport tubes
- ❖ Dry transport – 30X sample concentration versus use of flocked swab with VTM
- ❖ No contamination from swab materials
- ❖ Resuspend sample directly into minimal assay buffer volume to improve downstream assay performance
- ❖ Can remove or retain extraction step

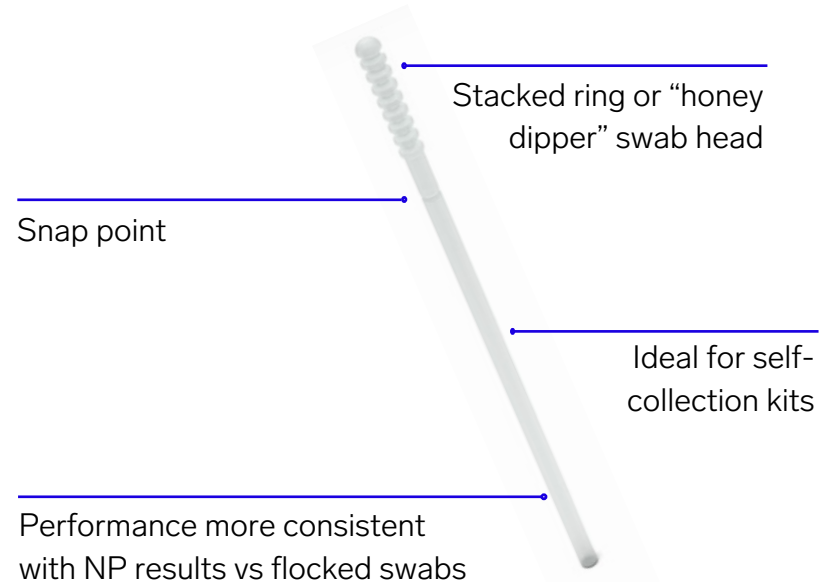


Not Quite Ready for Automation?

- ❖ Identical swab head eases later transition into automated RHINOstic workflow
- ❖ Injection molded polypropylene ensures comfortable collection
- ❖ Snap point facilitates tube compatibility
- ❖ Dry transport – 30X sample concentration versus use of flocked swab with VTM
- ❖ No contamination from swab materials
- ❖ Resuspend sample directly into minimal buffer volume to improve downstream assay performance
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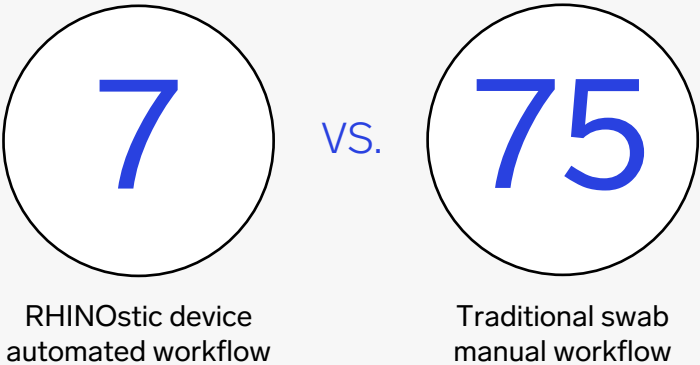
Rhinostics SIMPLEstic™ Swab



Accomplish More with Less Hands-On Time

- Harvard University and MIT have processed 2M+ RHINOstic based samples and counting
- Labor costs drop to under \$0.50 per sample by automating swabs
- Streamline hands-free accessioning and decapping: accommodate high-volume test demands and surges while reallocating personnel focus to higher value tasks
- Reduce costs: VTM, extraction kits, pipette tips
- Automate heat inactivation: eliminate extraction step and contamination risk from flocked swab
- Gain confidence: assay performance more closely resembles NP results than flocked swabs
- Enhance lab efficiency: reduce turnaround time, increase consistency

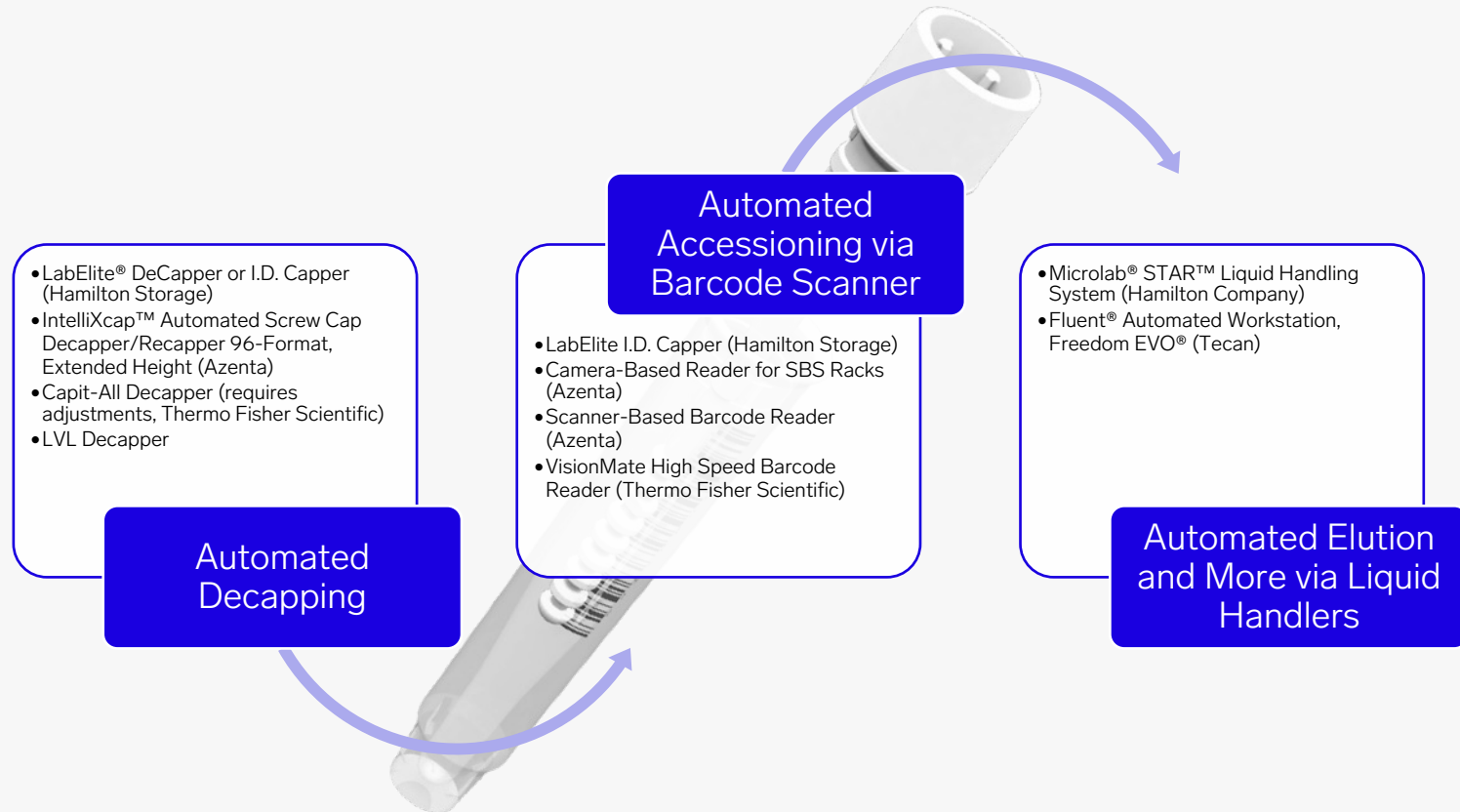
Personnel needed to process 15,000+ samples/day



Lab productivity when testing 10,000 samples via the automated RHINOstic workflow

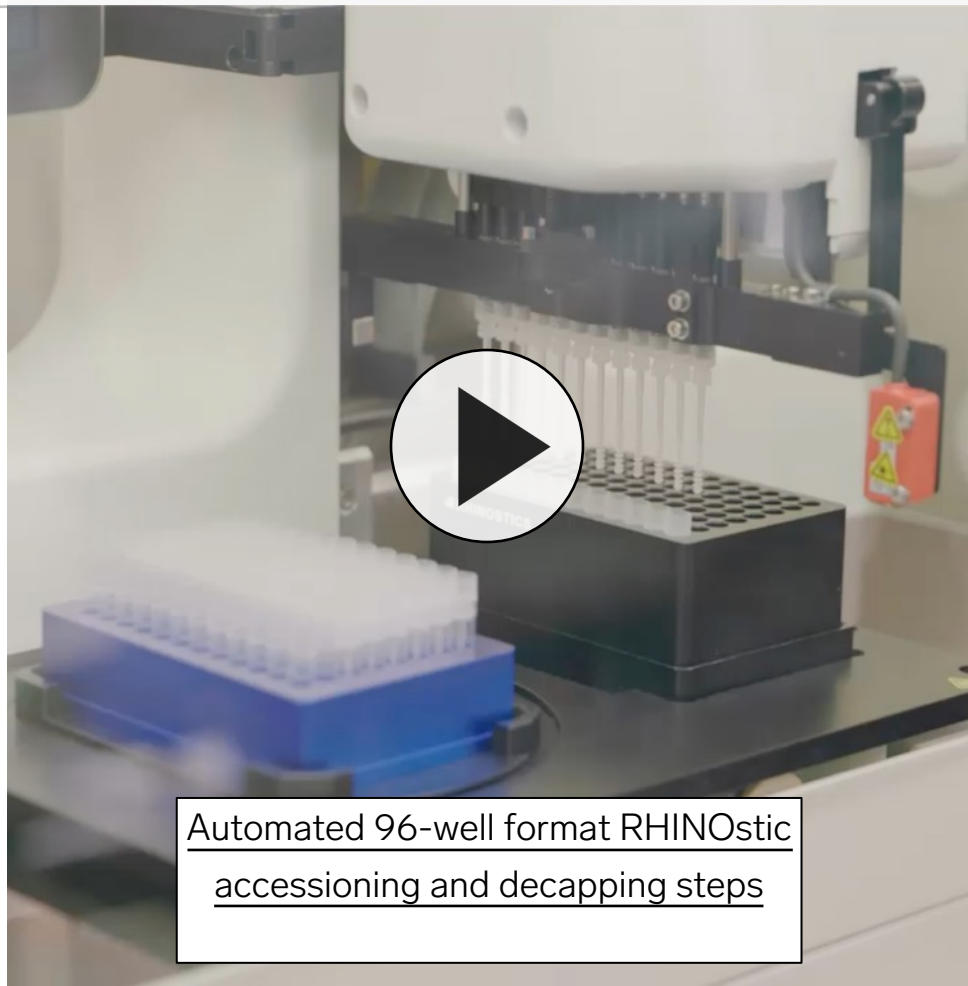
Decapper	Hours saved	Percentage	Additional sample flow	Hours saved per month
12-Well	8	25%	2500	236
96-Well	26	83%	8333	788

Simply Connect Sample Accessioning into Assay Workflow



Paramount Automation Advantages

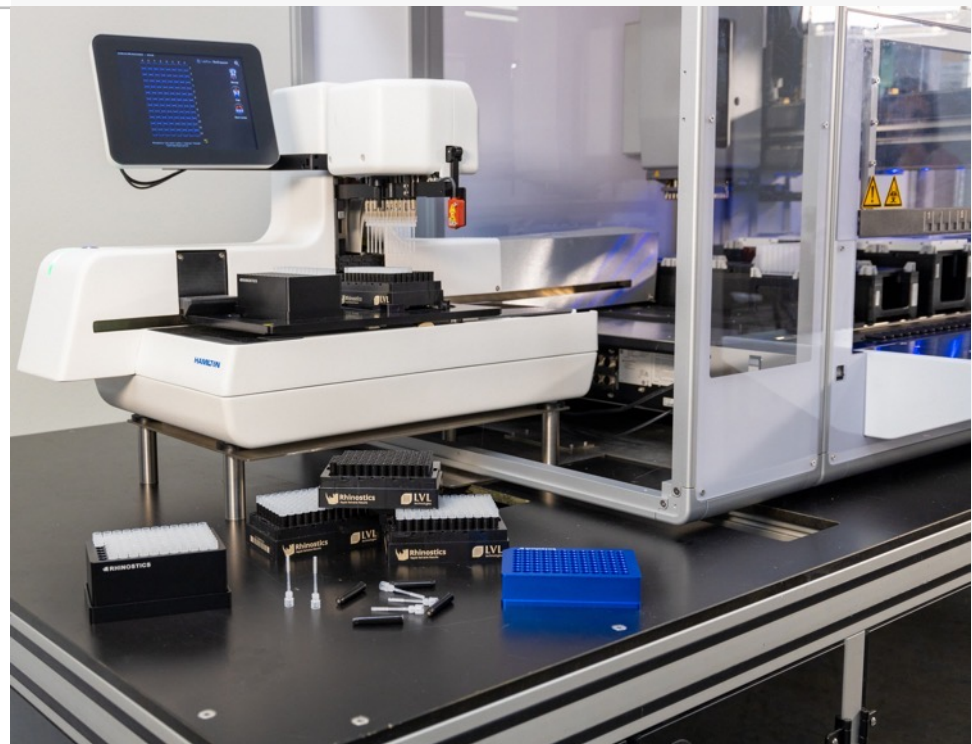
- ❏ Rhinostics leads the way in automatable purpose-built sample collection devices
 - ❏ RHINOstic: the first automation-friendly swab
 - ❏ VERIstic: the first automation-friendly blood collection device
- ❏ High sample processing throughput shortens turnaround times without increasing labor
- ❏ Hands-free operation reduces biohazard exposure
- ❏ Repeatable performance increases consistency



Automated 96-well format RHINOstic
accessioning and decapping steps

Valued Automation Partners: Hamilton

- ❏ Hamilton Storage Technologies
 - ❏ LabElite DeCapper or I.D. Capper, with 12-channel head
 - ❏ Standalone and integrated options available
 - ❏ Requires Rhinostic Conversion Kit HST44258
 - ❏ 96-channel head pending
- ❏ Hamilton Company (aka Hamilton Robotics)
 - ❏ Microlab STAR automated liquid handling workstations



Automated RHINOstic workflow utilizing the LabElite I.D. Capper from Hamilton Storage and the Microlab STAR automated liquid handler from Hamilton Company

Valued Automation Partners: Azenta

- IntelliXcap™ 96 Automated Screw Cap
 - Decapper/Recapper 96-Format, Extended Height
 - 96 samples at once within 20 seconds
 - Extended height specifically optimized for RHINOstic swabs
 - Standalone and integrated options available
- Barcode Readers
 - Camera-based readers
 - Scanner-based readers



Automated RHINOstic capping and decapping utilizing the IntelliXcap 96 Automated Screw Cap Decapper/Recapper 96-Format, Extended Height from Azenta

Clinically Proven

Harvard University Clinical Laboratory:
Quaeris SARS-CoV-2 Assay EUA Summary, July 8, 2021

FDA Cleared Swab			
		Pos	Neg
RHINOstic Swab	Pos	42	0
	Neg	1	167
	Total	43	167
Agreement		PPA = 97.7% (95% CI: 87.9 – 99.6%)	NPA = 100% (95% CI: 97.8 – 100%)

Clinical performance of 210 paired samples obtained with the RHINOstic swab compared to samples obtained with second FDA cleared swab. 47 participants swabbed with Copan FLOQ and Rhinostics swab and SARS-CoV-2 presence in both swabs was tested with the Quaeris SARS-CoV-2 assay. 145 cases, paired samples were collected on the same day with RHINOstic swab and the swab provided CRPS SARS-CoV-2 test (Broad Institute authorized COVID-19 test) at the Broad Institute.

Rhinostics® Submitted an EUA for Thermo Fisher's TaqPath™ Covid-19 Combo Kit

Nasopharyngeal Swab: Roche cobas SARS-COV-2 Assay			
		Pos	Neg
RHINOstic Swab	Pos	38	2
	Neg	2	327
	Total	40	329
Agreement		PPA = 95%	NPA = 99%

Clinical performance of 369 paired samples obtained with the RHINOstic Automated Swab compared to samples obtained with FDA cleared nasopharyngeal swab tested on the Roche cobas SARS-COV-2 assay.

Growing Portfolio of Proprietary Patent-Pending Products



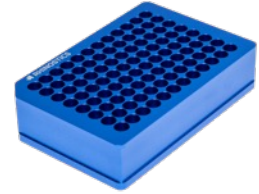
RHINOstic® Automated Swab



Standard Swab



**GrooveSwab®
Nasopharyngeal Swab**



RHINOrac™



VERIstic™ Collection Device



SIMPLEstic™ Swab

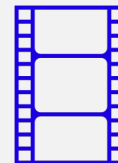


RHINOrest™

News and Awards



- ❖ [Rhinostics Launches the VERIstic™ to Redefine Small Volume Blood Collection](#)
- ❖ [RHINOstic Automated Nasal Swab Earns Health Canada COVID-19 Interim Order No. 2 Medical Device Authorization](#)
- ❖ [Rhinostics and Nexus Medical Labs Announce Partnership to Launch Rapid, Cost-Efficient Swab Sample Processing for Telehealth and Broader Industries](#)
- ❖ [Hamilton and Rhinostics Reinvent Rapid Swab-Based Sample Workflows from Collection to Processing](#)
- ❖ [P&G Partners With Rhinostics to Take Innovative Nasal Swab to Market to Improve Speed of COVID-19 Testing](#)



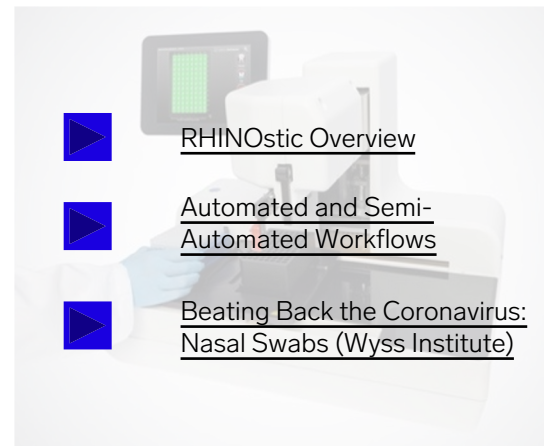
[RHINOstic Overview](#)



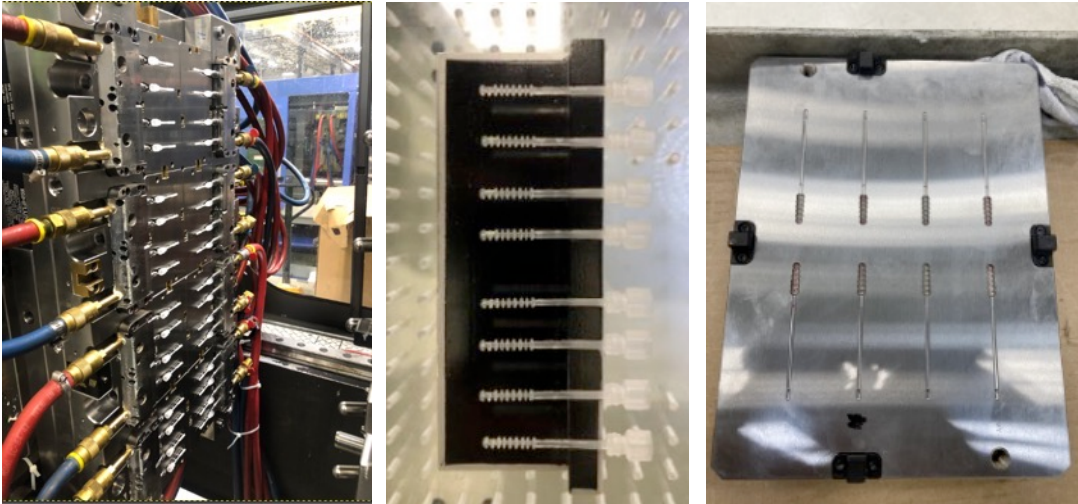
[Automated and Semi-Automated Workflows](#)



[Beating Back the Coronavirus: Nasal Swabs \(Wyss Institute\)](#)



Flexible yet Aggressive Manufacturing Programs



2022 Manufacturing Capacity

Parts per Month

RHINOstic
Automated Swab

Up to 9
million

Rhinostics
Standard Swab

Up to 2
million

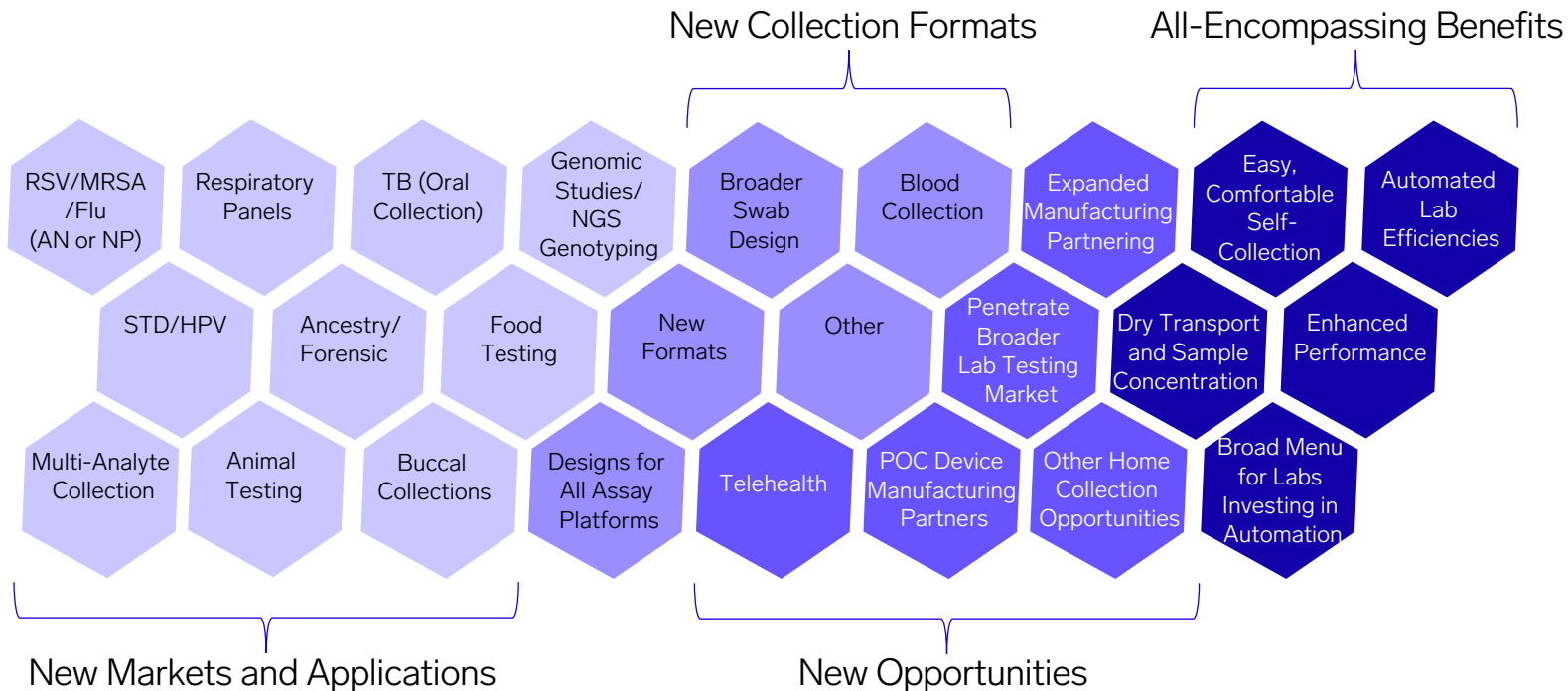
Rhinostics
GrooveSwab
Nasopharyngeal Swab

Up to 1
million

Manufacturing Achievements:

- Launched 7 manufacturing programs
- Rapid transition from prototype to production

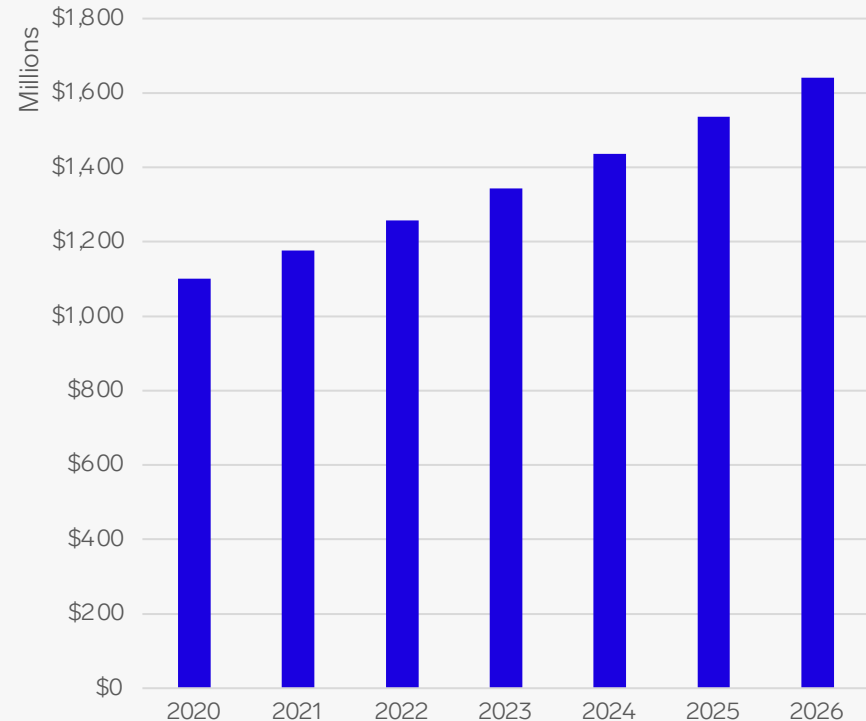
Our Future: Proprietary Products, Impactful Opportunities



The Swab Market Must Evolve

- ❖ Dominated by two longstanding family businesses
 - ❖ No significant innovation over 50+ years
 - ❖ Inefficient bottleneck in Dx workflows
 - ❖ Supply shortages kneecapped the world at COVID's onset
- ❖ Other limitations (long TAT, high labor costs, low throughput) were amplified during COVID and rippled through other markets
- ❖ Swabs are critical to markets, but they are open to change

Global Medical Swabs Mkt



Source: <https://www.fortunebusinessinsights.com/medical-swabs-market-103318>

Thank You

Join the Swab Test Workflow Revolution!



sales@rhinostics.com

Rhinostics Product Portfolio Overview

Appendix A

RHINOstic® Automated Swab (sterile)



RH-S000001

RHINOstic Automated Swab Kit, Clear, Unmarked Capped Tube

Individually packaged swabs with bulk capped, unmarked collection tubes.



LV-2D1D002

RHINOstic Automated Swab Kit, Clear Uncapped 1D/2D/Visible Barcoded Tube

Swab and uncapped clear UV-etched transport tube, sterilized together in individual packages.



LV-2D1D003

RHINOstic Automated Swab Kit, Black Uncapped 1D/2D/Visible Barcoded Tube

Swab and uncapped cryolabeled black transport tube, sterilized together in individual packages.



RH-S000111

RHINOstic Automated Swab (no tube), Peel Pack

Individual swabs, no tube, peel pack.

VERIstic™ Collection Device



VS-S000011

**VERIstic Collection Device Kit, Clear, Unmarked
Capped Tube**

Individually packaged devices with bulk capped,
unmarked collection tubes. Available ~4Q22

Rhinostics Swabs (sterile)



PG-100001

**Rhinostics Standard Swab
(no tube), Peel Pack**

Individual peel pack swabs.



PG-100011

**Rhinostics Standard Swab
Collection Kit**

Individual swabs with bulk
capped, unmarked collection
tubes.



GW-UF100001

**GrooveSwab®
Nasopharyngeal Swab,
Unflocked (no tube), Peel
Pack**

Individual peel pack swabs.



SS-S000001

**SIMPLEstic™ Swab (no
tube), Peel Pack**

Individual swabs, no tube, peel
pack. Coming soon.

Rhinostics Swab Processing Accessories



LV-RK96001

96 Well Rack, Plastic



RR-100002

RHINOrac™ Aluminum
Rack



RRT-A00001

RHINOrest™, Aluminum
Cap Holder, Assembled
(block and base)