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UNITED STATES
SECURITIES AND EXCHANGE
COMMISSION WASHINGTON, D.C. 20549

FORM 10-Q

☒ **QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the Quarterly Period Ended March 31, 2021

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the Transition Period From ________ to ________

Commission File Number: 001-36338

22nd Century Group, Inc.

(Exact name of registrant as specified in its charter)

Nevada	**98-0468420**
(State or other jurisdiction of incorporation)	(IRS Employer Identification No.)

500 Seneca Street, Suite 507, Buffalo, New York 14204
(Address of principal executive offices)

(716) 270-1523
(Registrant's telephone number, including area code)

8560 Main Street, Suite 4, Williamsville, New York 14221
(Registrant's former office)

Securities registered under Section 12(b) of the Act:

Title of each class	Ticker symbol	Name of Exchange on Which Registered
Common Stock, $0.00001 par value	XXII	NYSE American

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).

Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☐	Accelerated filer	☐
Non-accelerated filer	☒	Smaller reporting company	☒
		Emerging growth company	☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes ☐ No ☒

As of May 4, 2021, there were 152,444,163 shares of common stock issued and outstanding.

22nd CENTURY GROUP, INC.

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22nd CENTURY GROUP, INC. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(Unaudited)
($ in thousands)

	March 31, 2021	December 31, 2020
ASSETS		
Current Assets:		
Cash and cash equivalents	$ 1,272	$ 1,029
Short-term investment securities	29,671	21,313
Accounts receivable, net	2,023	2,159
Inventory, net	2,137	2,034
Prepaid expenses and other assets	1,280	1,806
Total current assets	36,383	28,341
Property, plant and equipment:		
Machinery and equipment, net	2,487	2,483
Operating leases right-of-use assets, net	182	247
Total property, plant and equipment	2,669	2,730
Other assets:		
Intangible assets, net	8,110	8,211
Investments	6,643	6,536
Convertible note	5,876	5,876
Total other assets	20,629	20,623
Total assets	$ 59,681	$ 51,694
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current liabilities:		
Notes payable	$ 295	$ 539
Operating lease obligations	182	247
Accounts payable	1,572	1,116
Accrued expenses	4,681	4,830
Accrued severance	274	339
Deferred income	—	272
Total current liabilities	7,004	7,343
Long-term liabilities:		
Severance obligations	187	241
Total liabilities	7,191	7,584
Commitments and contingencies (Note 11)		
Shareholders' equity		
10,000,000 preferred shares, $.00001 par value		
300,000,000 common shares, $.00001 par value		
Capital stock issued and outstanding:		
152,397,501 common shares (139,061,690 at December 31, 2020)		
Common stock value	2	1
Capital in excess of par value	202,880	189,439
Accumulated other comprehensive (loss) income	42	74
Accumulated deficit	(150,434)	(145,404)
Total shareholders' equity	52,490	44,110
Total liabilities and shareholders' equity	$ 59,681	$ 51,694

See accompanying notes to consolidated financial statements.

22nd CENTURY GROUP, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS
(Unaudited)
($ in thousands except per-share data)

	Three Months Ended March 31, 2021	Three Months Ended March 31, 2020
Revenue:		
Sale of products, net	$ 6,806	$ 7,058
Cost of goods sold (exclusive of depreciation shown separately below):		
Products	6,159	6,771
Gross profit (loss)	647	287
Operating expenses:		
Research and development	689	811
Research and development - MRTP	12	149
Sales, general and administrative	4,829	3,141
Depreciation	138	156
Amortization	150	172
Total operating expenses	5,818	4,429
Operating loss	(5,171)	(4,142)
Other income (expense):		
Unrealized gain (loss) on investments	36	(445)
Realized gain (loss) on short-term investment securities	—	(3)
Interest income, net	112	612
Interest expense	(7)	(12)
Total other income (expense)	141	152
Loss before income taxes	(5,030)	(3,990)
Income taxes	—	38
Net loss	$ (5,030)	$ (4,028)
Other comprehensive income (loss):		
Unrealized gain (loss) on short-term investment securities	(32)	(196)
Reclassification of (gain) loss to net loss	—	3
Other comprehensive income (loss)	(32)	(193)
Comprehensive loss	$ (5,062)	$ (4,221)
Net loss per common share - basic and diluted	$ (0.03)	$ (0.03)
Weighted average common shares outstanding - basic and diluted (in thousands)	144,258	138,610

See accompanying notes to consolidated financial statements.

22nd CENTURY GROUP, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY
(Unaudited)
($ in thousands except share data)

	Three Months Ended March 31, 2021					
	Common Shares Outstanding	Par Value of Common Shares	Capital in Excess of Par Value	Accumulated Other Comprehensive Income	Accumulated Deficit	Total Shareholders' Equity
Balance at December 31, 2020	**139,061,690**	**$ 1**	**$ 189,439**	**$ 74**	**$ (145,404)**	**$ 44,110**
Stock issued in connection with RSU vesting	1,196,258	—	—	—	—	—
Stock issued in connection with option exercises	846,342	—	1,153	—	—	1,153
Stock issued in connection with warrant exercises	11,293,211	1	11,781	—	—	11,782
Equity-based compensation	—	—	507	—	—	507
Unrealized gain (loss) on short-term investment securities	—	—	—	(32)	—	(32)
Net loss	—	—	—	—	(5,030)	(5,030)
Balance at March 31, 2021	**152,397,501**	**$ 2**	**$ 202,880**	**$ 42**	**$ (150,434)**	**$ 52,490**

	Three Months Ended March 31, 2020					
	Common Shares Outstanding	Par Value of Common Shares	Capital in Excess of Par Value	Accumulated Other Comprehensive Income	Accumulated Deficit	Total Shareholders' Equity
Balance at December 31, 2019	**138,362,809**	**$ 1**	**$ 187,735**	**$ 7**	**$ (125,693)**	**$ 62,050**
Stock issued in connection with RSU vesting	491,384	—	—	—	—	—
Equity-based compensation	—	—	481	—	—	481
Unrealized gain (loss) on short-term investment securities	—	—	—	(196)	—	(196)
Reclassification of losses (gains) to net loss	—	—	—	3	—	3
Net loss	—	—	—	—	(4,028)	(4,028)
Balance at March 31, 2020	**138,854,193**	**$ 1**	**$ 188,216**	**$ (186)**	**$ (129,721)**	**$ 58,310**

See accompanying notes to consolidated financial statements.

22nd CENTURY GROUP, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS
(Unaudited)
($ in thousands)

	Three Months Ended March 31,	
	2021	2020
Cash flows from operating activities:		
Net loss	$ (5,030)	$ (4,028)
Adjustments to reconcile net loss to cash used in operating activities:		
Amortization and depreciation	226	266
Amortization of license fees	62	62
Amortization of ROU Asset	65	71
Unrealized (gain) loss on investment	(36)	445
Realized (gain) loss on short-term investment securities	—	3
Accretion of non cash interest expense	6	12
Accretion of non cash interest income	(45)	(209)
Equity-based employee compensation expense	507	481
(Increase) decrease in assets:		
Accounts receivable	135	(266)
Inventory	(103)	(182)
Prepaid expenses and other assets	526	(273)
Increase (decrease) in liabilities:		
Operating lease obligations	(66)	(70)
Accounts payable	381	(639)
Accrued expenses	(148)	(188)
Accrued severance	(119)	(213)
Deferred income	(272)	66
Net cash provided by (used in) operating activities	(3,911)	(4,662)
Cash flows from investing activities:		
Acquisition of patents, trademarks, and licenses	(20)	(103)
Acquisition of machinery and equipment	(100)	(8)
Sales and maturities of short-term investment securities	4,950	11,613
Purchase of short-term investment securities	(13,365)	(6,606)
Net cash provided by (used in) investing activities	(8,535)	4,896
Cash flows from financing activities:		
Payment on note payable	(246)	—
Net proceeds from option exercise	1,153	—
Net proceeds from warrant exercise	11,782	—
Net cash provided by (used in) financing activities	12,689	—
Net increase (decrease) in cash and cash equivalents	243	234
Cash and cash equivalents - beginning of period	1,029	485
Cash and cash equivalents - end of period	$ 1,272	$ 719
Supplemental disclosures of cash flow information:		
Net cash paid for:		
Cash paid during the period for interest	$ 1	$ —
Non-cash transactions:		
Patent and trademark additions included in accounts payable	$ 29	$ 88
Machinery and equipment additions included in accounts payable	$ 43	$ —
Right-of-use assets and corresponding operating lease obligations	$ —	$ 198

See accompanying notes to consolidated financial statements.

22nd CENTURY GROUP, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
March 31, 2021
(Unaudited)
Amounts in thousands, except for share and per-share data

NOTE 1. - NATURE OF BUSINESS AND SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation - The accompanying unaudited consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles ("GAAP") for interim financial information and with the instructions to Form 10-Q. Accordingly, they do not include all the information and footnotes required by GAAP for complete financial statements. In the opinion of management, all adjustments consisting of normal recurring accruals considered necessary for a fair and non-misleading presentation of the financial statements have been included.

Operating results for the three months ended March 31, 2021 are not necessarily indicative of the results that may be expected for the year ending December 31, 2021. The balance sheet as of December 31, 2020 has been derived from the audited consolidated financial statements at that date but does not include all the information and footnotes required by GAAP for complete financial statements.

These interim consolidated financial statements should be read in conjunction with the December 31, 2020 audited consolidated financial statements and the notes thereto contained in our Annual Report on Form 10-K for the year ended December 31, 2020, as filed with the Securities and Exchange Commission on March 11, 2021.

Principles of Consolidation - The accompanying consolidated financial statements include the accounts of 22nd Century Group, Inc. ("22nd Century Group"), its three wholly-owned subsidiaries, 22nd Century Limited, LLC ("22nd Century Ltd"), NASCO Products, LLC ("NASCO"), and Botanical Genetics, LLC ("Botanical Genetics"), and two wholly-owned subsidiaries of 22nd Century Ltd, Goodrich Tobacco Company, LLC ("Goodrich Tobacco") and Heracles Pharmaceuticals, LLC ("Heracles Pharma") (collectively, "the Company"). All intercompany accounts and transactions have been eliminated.

Nature of Business - 22nd Century Group is a leading biotechnology company developing disruptive plant-based solutions for the life science, consumer product, and pharmaceutical markets. The Company is focused on technology that allows it to alter the level of nicotine and other nicotinic alkaloids in tobacco plants and the levels of cannabinoids and terpenes in hemp/cannabis plants through genetic engineering and modern plant breeding techniques. Goodrich Tobacco and Heracles Pharma are business units for the Company's potential modified risk tobacco products. NASCO is a federally licensed tobacco products manufacturer, a subsequent participating member under the tobacco Master Settlement Agreement ("MSA") between the tobacco industry and the settling states under the MSA and operates the Company's tobacco products manufacturing business in North Carolina. Botanical Genetics is a wholly-owned subsidiary of 22nd Century Group that performs research and development related to the Company's hemp/cannabis business.

COVID-19 Pandemic – The COVID-19 pandemic has adversely impacted the U.S. economy and supply chains and created volatility in U.S. financial markets. The COVID-19 pandemic has had a minimal impact on the Company's operations in 2020 and thus far in 2021, but there is a risk that state and federal authorities' responses to the COVID-19 pandemic or another pandemic may disrupt our business in the future. Our executive leadership team and staff are monitoring this evolving situation and its impacts on our business. We will continue to monitor the local, state and federal guidance regarding our business practices.

During April 2021, the Company relocated its corporate headquarters into downtown Buffalo, NY. The new office, as well as all of our facilities, continue to operate under state and federal protocols which include physical distancing, mandatory face coverings, and disinfection of surfaces. We also continue to encourage remote work arrangements by our employees where job duties permit.

Our executive leadership team and staff are monitoring this evolving situation and its impacts on our business. We will continue to monitor the local, state and federal guidance regarding our business practices.

Use of Estimates - The preparation of financial statements in conformity with accounting principles generally accepted in the U.S. requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure

of contingent assets and liabilities at the date of the financial statements and the reported amounts of income and expenses during the reporting period. Actual results could differ from those estimates.

Intangible Assets – Intangible assets are recorded at cost and consist primarily of (1) expenditures incurred with third-parties related to the processing of patent claims and trademarks with government authorities, as well as costs to acquire patent rights from third-parties, (2) license fees paid for third-party intellectual property, (3) costs to become a signatory under the tobacco MSA, and (4) license fees paid to acquire a predicate cigarette brand. The amounts capitalized relate to intellectual property that the Company owns or to which it has rights to use.

The Company's capitalized intellectual property costs are amortized using the straight-line method over the remaining statutory life of the granted patent assets in each of the Company's patent families, which have estimated expiration dates ranging from 2026 to 2041. Periodic maintenance or renewal fees are expensed as incurred. Annual minimum license fees are charged to expense. License fees paid for third-party intellectual property are amortized on a straight-line basis over the last to expire patents, which have expected expiration dates ranging from 2028 through 2036. The Company believes costs associated with becoming a signatory to the MSA and acquiring a predicate cigarette brand have an indefinite life and as such, no amortization is taken. At each reporting period, the Company evaluates whether events and circumstances continue to support the indefinite-lived classification.

Impairment of Long-Lived Assets – The Company reviews the carrying value of its amortizing long-lived assets whenever events or changes in circumstances indicate that the historical cost-carrying value of an asset may no longer be recoverable. On at least an annual basis, the Company assesses whether events or changes in circumstances indicate that the carrying amount may not be recoverable. If any such indicators are present, the Company will test for recoverability in accordance with ASC 360-Property, plant, and equipment or ASC 350-Intangibles, Goodwill, and Other.

Intangible assets subject to amortization are reviewed for strategic importance and commercialization opportunity prior to expiration. If it is determined that the asset no longer supports the Company's strategic objectives and/or will not be commercially viable prior to expiration, the asset is impaired. In addition, the Company will assess the expected future undiscounted cash flows for its intellectual property based on consideration of future market and economic conditions, competition, federal and state regulations, and licensing opportunities. If the carrying value of such assets are not recoverable, the carrying value will be reduced to fair value.

Indefinite-lived intangible asset carrying values are reviewed at least annually or more frequently if events or changes in circumstances indicate that it is more likely than not that an impairment exists. The Company first performs a qualitative assessment and considers its current strategic objectives, future market and economic conditions, competition, and federal and state regulations to determine if an impairment is more likely than not. If it is determined that an impairment is more likely than not, a quantitative assessment is performed to compare the asset carrying value to fair value.

Fair Value of Financial Instruments **-** The Company's financial instruments include cash and cash equivalents, short-term investment securities, accounts receivable, investments, a convertible note receivable, accounts payable, accrued expenses, and notes payable. Other than for cash equivalents, short-term investment securities, certain investments, and the convertible note receivable, fair value is assumed to approximate carrying values for these financial instruments, since they are short term in nature, they are receivable or payable on demand, or had stated interest rates that approximate the interest rates available to the Company as of the reporting date. The determination of the fair value of cash equivalents, short-term investment securities, investments, and convertible note receivable are discussed in Note 6.

Investments **-** Under ASU 2016-01, equity securities are recorded at fair value, with changes in fair value recorded through the statement of operations. Equity securities without a readily determinable market value are carried at cost less impairment, adjusted for observable price changes in orderly transactions for an identical or similar investment of the same issuer. The Company considers its debt instruments as available-for-sale securities, and accordingly, all unrealized gains and losses incurred on the short-term investment securities (the adjustment to fair value) are recorded in other comprehensive income or loss on the Company's Consolidated Statements of Operations and Comprehensive Loss.

Stock Based Compensation - The Company uses a fair-value based method to determine compensation for all arrangements under which Company employees and others receive shares, restricted stock units or options, to purchase common shares of the Company. Stock based compensation expense is recorded over the requisite service period based on estimates of probability and time of achieving milestones and vesting. Forfeitures are accounted for when they occur.

Income Taxes **-** For interim income tax reporting, due to a full valuation allowance on net deferred tax assets, no income tax expense or benefit is recorded unless it is an unusual or infrequently occurring item. The tax effects of unusual or infrequently occurring items, including changes in judgment about valuation allowances and effects of changes in tax laws or rates, are reported in the interim period in which they occur.

NOTE 2. - INVENTORY

Inventories are valued at the lower of historical cost or net realizable value. Cost is determined using an average cost method for tobacco leaf inventory and raw materials inventory. Standard cost is primarily used for finished goods inventory. Inventories are evaluated to determine whether any amounts are not recoverable based on slow moving or obsolete condition and are written off or reserved as appropriate.

Inventories at March 31, 2021 and December 31, 2020 consisted of the following:

	March 31, 2021	December 31, 2020
Inventory - tobacco leaf	$ 703	$ 821
Inventory - finished goods		
Cigarettes and filtered cigars	229	171
Inventory - raw materials		
Cigarette and filtered cigar components	1,305	1,142
Less: inventory reserve	(100)	(100)
	$ 2,137	$ 2,034

NOTE 3. - MACHINERY AND EQUIPMENT

Machinery and equipment at March 31, 2021 and December 31, 2020 consisted of the following:

	Useful Life	March 31, 2021	December 31, 2020
Cigarette manufacturing equipment	3 or 10 years	$ 4,924	$ 4,893
Office furniture, fixtures and equipment	5 Years	26	20
Laboratory equipment	5 Years	117	117
Leasehold improvements	6 Years	123	123
Construction in progress		105	—
Less: accumulated depreciation		(2,808)	(2,670)
Machinery and equipment, net		$ 2,487	$ 2,483

Depreciation expense was $138 for the three months ended March 31, 2021 ($156 for the three months ended March 31, 2020).

NOTE 4. - RIGHT-OF-USE ASSETS, LEASE OBLIGATIONS, AND OTHER LEASES

The Company leases a manufacturing facility and warehouse in North Carolina, a corporate headquarters in Buffalo, New York, and a laboratory space in Buffalo, New York. The tables outlined below represent information regarding the Company's manufacturing facility lease and laboratory lease which are both classified as operating leases and are currently reflected within the Consolidated Balance Sheets.

The following table summarizes the Company's discount rate and remaining lease terms:

Weighted average remaining lease term in years	0.8
Weighted average discount rate	4.4 %

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Future minimum lease payments as of March 31, 2021 are as follows:

2021	$ 176
2022	9
Total lease payments	185
Less: imputed interest	(3)
Total	$ 182

On January 15, 2021, the Company signed a lease agreement to relocate its corporate headquarters to the Larkinville District in downtown Buffalo, New York. The Company moved into the new office location in April 2021 and signed an amended lease agreement which revised the original lease commencement date to April 1, 2021. During the second quarter of 2021, the Company will recognize the respective right of use ("ROU") asset and lease liability for the new corporate headquarters on its Consolidated Balance Sheets. The lease has a monthly base rent of $6, which escalates 2.5% annually after the first year, and an initial term of 36 months—with two twenty-four-month optional renewal options at the Company's discretion.

NOTE 5. – INVESTMENTS & CONVERTIBLE NOTE RECEIVABLE

Investment in Panacea Life Sciences, Inc.

The Company has an investment in Panacea Life Sciences ("Panacea") that consists of three instruments: (i) shares of Series B preferred stock ("preferred stock"); (ii) a convertible note receivable with a $7,000 face value; and (iii) a warrant ("stock warrant") to purchase additional shares of Series B preferred stock, to obtain 51% ownership of Panacea, at an exercise price of $2.344 per share. The convertible note receivable and the preferred stock investment are considered available for sale debt securities with a private company that is not traded in active markets. Since observable price quotations were not available at acquisition, fair value was estimated based on cost less an appropriate discount upon acquisition. The discount on the convertible note receivable and preferred stock is being amortized into interest income over the respective term. See Note 6 for additional information on the fair value measurements.

The Company entered into a non-binding agreement with Panacea to potentially restructure the investment and business relationship. The non-binding agreement with Panacea generally provides for (i) the transfer of $7,170 in operational assets, including an agricultural facility and various extraction and distillation equipment, from Panacea to the Company in exchange for the cancellation of the $7,000 convertible note receivable plus accrued interest; (ii) an amendment of transaction documents to remove any future investment rights and obligations of the Company in Panacea, (iii) cancellation of the stock warrant to purchase additional Series B preferred stock; and (iv) various other amendments to Panacea's charter to amend various investors rights therein. As a result of the expected outcome of this non-binding agreement, the discount on the convertible note receivable is no longer amortized into interest income as the Company's total carrying value of its stock warrant, convertible note receivable, and accrued interest equals the fair value outlined in the non-binding agreement. However, the agreement to restructure the investment with Panacea is preliminary, non-binding, subject to change, and may not occur.

As of March 31, 2021, the total carrying value of the Company's investment in Panacea is outlined below:

	March 31, 2021	December 31, 2020
Panacea preferred stock	$ 5,244	$ 5,173
Panacea stock warrant	1,124	1,124
Accrued interest on convertible note receivable *(included within prepaid expenses and other assets)*	170	170
Convertible note receivable	5,876	5,876
Total	$ 12,414	$ 12,343

Investment in Aurora Cannabis, Inc.

The Company has an investment in Aurora Cannabis Inc. ("Aurora") stock warrants that are considered equity securities under ASC 321 – Investments – Equity Securities and a derivative instrument under ASC 815 – Derivatives and Hedging. The stock

warrants are not designated as a hedging instrument, and in accordance with ASC 815, the Company's investment in stock warrants are recorded at fair value with changes in fair value recorded to unrealized gain/loss as shown within the Company's Consolidated Statements of Operations and Comprehensive Loss. See Note 6 for additional information on the fair value measurements.

The total carrying value of the Company's investments at March 31, 2021 and December 31, 2020 consisted of the following:

	March 31, 2021	December 31, 2020
Aurora stock warrants	$ 275	$ 239
Panacea preferred stock	5,244	5,173
Panacea stock warrant	1,124	1,124
Total Investments	$ 6,643	$ 6,536
Convertible Note Receivable	$ 5,876	$ 5,876

NOTE 6. – FAIR VALUE MEASUREMENTS AND SHORT-TERM INVESTMENTS

FASB ASC 820 - "Fair Value Measurements and Disclosures" establishes a valuation hierarchy for disclosure of the inputs to valuation used to measure fair value. This hierarchy prioritizes the inputs into three broad levels as follows:

- Level 1 inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities;

- Level 2 inputs are quoted prices for similar assets and liabilities in active markets or inputs that are observable for the asset or liability, either directly or indirectly through market corroboration, for substantially the full term of the financial instrument; and

- Level 3 inputs are unobservable inputs based on the Company's own assumptions used to measure assets and liabilities at fair value.

A financial asset's or a financial liability's classification within the hierarchy is determined based on the lowest level input that is significant to the fair value measurement.

The following table presents information about our assets and liabilities measured at fair value as of March 31, 2021 and December 31, 2020, and indicates the fair value hierarchy of the valuation techniques the Company utilized to determine such fair value:

	Fair Value March 31, 2021			
	Level 1	Level 2	Level 3	Total
Assets				
Short-term investment securities:				
Money market funds	$ 22,001	$ —	$ —	$ 22,001
Corporate bonds	—	7,670	—	7,670
Total short-term investment securities	$ 22,001	$ 7,670	$ —	$ 29,671
Investment - Aurora stock warrants	$ —	$ —	$ 275	$ 275
Investment - Panacea preferred stock	$ —	$ —	$ 5,244	$ 5,244
Convertible note receivable	$ —	$ —	$ 5,876	$ 5,876

	Fair Value December 31, 2020			
	Level 1	Level 2	Level 3	Total
Assets				
Short-term investment securities:				
Money market funds	$ 8,636	$ —	$ —	$ 8,636
Corporate bonds	—	12,677	—	12,677
Total short-term investment securities	$ 8,636	$ 12,677	$ —	$ 21,313
Investment - Aurora stock warrants	$ —	$ —	$ 239	$ 239
Investment - Panacea preferred stock	$ —	$ —	$ 5,173	$ 5,173
Convertible note receivable	$ —	$ —	$ 5,876	$ 5,876

Money market mutual funds are valued at their daily closing price as reported by the fund. Money market mutual funds held by the Company are open-end mutual funds that are registered with the SEC that generally transact at a stable $1.00 Net Asset Value ("NAV") representing its estimated fair value. On a daily basis the fund's NAV is determined by the fund based on the amortized cost of the funds underlying investments.

Corporate bonds are valued using pricing models maximizing the use of observable inputs for similar securities.

The investment in the Aurora stock (ACB) warrants is measured at fair value using the Black-Scholes pricing model and is classified within Level 3 of the valuation hierarchy. The unobservable input is an estimated volatility factor of 143% and 137% as of March 31, 2021 and December 31, 2020, respectively. Therefore, changes in market volatility will impact the fair value measurement of our ACB investment.

A 20% increase or decrease in the volatility factor used as of March 31, 2021 would have the impact of increasing or decreasing the fair value measurement of the stock warrants by approximately $128. A 20% increase or decrease in the volatility factor used at December 31, 2020 would have the impact of increasing or decreasing the fair value measurement of the stock warrants by approximately $115.

The Panacea convertible note receivable and the preferred stock investment are considered available-for-sale debt securities with a private company that is not traded in active markets. Since observable price quotations were not available, fair value was estimated based on cost less an appropriate discount upon acquisition.

The following table sets forth a summary of the changes in fair value of the Company's Level 3 investments for the three months ended March 31, 2021:

Fair Value at December 31, 2020	$ 11,288
Unrealized gain as a result of change in fair value	36
Accretion of interest on Panacea preferred stock	71
Fair Value at March 31, 2021	$ 11,395

The following tables set forth a summary of the Company's available-for-sale debt securities from amortized cost basis to fair value as of March 31, 2021 and December 31, 2020:

	Available for Sale Debt Securities March 31, 2021			
	Amortized Cost Basis	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
Corporate bonds	$ 7,628	$ 42	$ —	$ 7,670
Convertible note receivable	5,876	—	—	5,876
Investment - Panacea preferred stock	5,244	—	—	5,244
	$ 18,748	$ 42	$ —	$ 18,790

	Available for Sale Debt Securities December 31, 2020			
	Amortized Cost Basis	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
Corporate bonds	$ 12,603	$ 74	$ —	$ 12,677
Convertible note receivable	5,876	—	—	5,876
Investment - Panacea preferred stock	5,173	—	—	5,173
	$ 23,652	$ 74	$ —	$ 23,726

The following table sets forth a summary of the Company's available-for-sale securities from amortized cost basis and fair value by contractual maturity as of March 31, 2021 and December 31, 2020:

	Available for Sale Debt Securities			
	March 31, 2021		December 31, 2020	
	Amortized Cost Basis	Fair Value	Amortized Cost Basis	Fair Value
Due in one year or less	$ 7,628	$ 7,670	$ 11,692	$ 11,753
Due after one year through five years	11,120	11,120	11,960	11,973
Due in five years	—	—	—	—
	$ 18,748	$ 18,790	$ 23,652	$ 23,726

NOTE 7. - INTANGIBLE ASSETS

Total intangible assets at March 31, 2021 and December 31, 2020 consisted of the following:

	March 31, 2021	December 31, 2020
Intangible assets, net		
Patent and trademark costs	$ 5,717	$ 5,667
Less: accumulated amortization	(3,025)	(2,936)
Patent and trademark costs, net	2,692	2,731
License fees	3,876	3,876
Less: accumulated amortization	(1,010)	(948)
License fees, net	2,866	2,928
MSA signatory costs	2,202	2,202
License fee for predicate cigarette brand	350	350
	$ 8,110	$ 8,211

Amortization expense relating to the above intangible assets for the three months ended March 31, 2021 amounted to $150 ($172 for the three months ended March 31, 2020).

NOTE 8. – NOTES PAYABLE

License Fees

On June 22, 2018, the Company entered into the Second Amendment to the License Agreement (the "Second Amendment") with North Carolina State University ("NCSU") that amended an original License Agreement between the Company and NCSU, dated December 8, 2015, and the First Amendment, dated February 14, 2018, to the original License Agreement. Under the terms of the Second Amendment, the Company was obligated to pay NCSU milestone payments totaling $1,200, which originally amounted to a present value of $1,175. As of June 30, 2020 the Company paid the final milestone payment of $300. The cost of the of acquired license amounted to $1,175 and is included in Intangible assets, net on the Company's Consolidated Balance Sheets, and is amortized on a straight-line basis over the last-to-expire patent, which is expected to be in 2036.

On October 22, 2018, the Company entered into a License Agreement with the University of Kentucky. Under the terms of the License Agreement, the Company is obligated to pay the University of Kentucky milestone payments totaling $1,200, of which $300 was payable upon execution, and $300 will be payable annually over three years on the anniversary of the execution of the License Agreement. The Company has recorded the present value of the obligations under the License Agreement as a note payable that originally amounted to $1,151. The cost of the of acquired licenses amounted to $1,151 and is included in Intangible assets, net on the Company's Consolidated Balance Sheets and will be amortized on a straight-line basis over the last-to-expire patent, which is expected to be in 2033.

D&O Insurance

During the second quarter of 2020, the Company renewed its Director and Officer ("D&O") insurance for a one-year policy premium totaling $2,744. The Company paid $549 as a premium down payment and financed the remaining $2,195 of policy premiums over nine months at a 3.19% annual percentage rate.

The table below outlines our notes payable balances as of March 31, 2021 and December 31, 2020:

	March 31, 2021	December 31, 2020
License Fees	$ 295	$ 293
D&O Insurance	—	246
Total current notes payable	$ 295	$ 539

Accretion of non-cash interest expense amounted to $2 for the three months ended March 31, 2021 and $6 for the three months ended March 31, 2020.

NOTE 9. – SEVERANCE LIABILITY

During the second quarter of 2020, the Company recorded severance benefits of $306 related to a resignation which will be provided over a twelve-month period. During 2019, the Company recorded severance benefits of $881. Consistent with certain contractual obligations, $771 of the related benefit will be provided over a period of forty-two months.

The current and long-term accrued severance balance remaining as of March 31, 2021 was $274 and $187, respectively. The current and long-term accrued severance balance remaining as of December 31, 2020 was $339 and $241, respectively.

NOTE 10. - WARRANTS FOR COMMON STOCK

During the first quarter of 2021, the Company's warrant holders exercised all 11,293,211 outstanding warrants for cash in exchange for common stock. In connection with these exercises, the Company received net proceeds of $11,782. No warrants remain outstanding as of March 31, 2021.

The following table summarizes the Company's outstanding warrant activity since December 31, 2020:

	Number of Warrants
Warrants outstanding at December 31, 2020	11,293,211
Warrants exercised in Q1 2021	(11,293,211)
Warrants outstanding at March 31, 2021	—

NOTE 11. - COMMITMENTS AND CONTINGENCIES

License agreements and sponsored research – The Company has entered into various license, sponsored research, collaboration, and other agreements (the “Agreements”) with various counter parties in connection with the Company’s plant biotechnology business relating to tobacco and hemp/cannabis. The schedule below summarizes the Company’s commitments, both financial and other, associated with each Agreement. Costs incurred under the Agreements are generally recorded as research and development expenses on the Company’s Consolidated Statements of Operations and Comprehensive Loss.

				Future Commitments						
Commitment	**Counter Party**	**Product Relationship**	**Commitment Type**	**2021**	**2022**	**2023**	**2024**	**2025 & After**	**Total**	
Research Agreement	KeyGene	Hemp / Cannabis	Contract fee	$ 900	$ 1,200	$ 1,200	$ 1,200	$ 300	$ 4,800	(1)
License Agreement	NCSU	Tobacco	Annual royalty fee	202	225	—	—	—	427	(2), (3)
License Agreement	NCSU	Tobacco	Minimum annual royalty	19	50	50	50	600	769	(3)
License Agreement	NCSU	Tobacco	Minimum annual royalty	38	50	50	50	500	688	(3)
Research Agreement	NCSU	Tobacco	Contract fee	75	—	—	—	—	75	(4)
Sublicense Agreement	Anandia Laboratories, Inc.	Hemp / Cannabis	Annual license fee	10	10	10	10	110	150	(5)
Research Agreement	Cannametrix	Hemp / Cannabis	Contract fee	150	50	—	—	—	200	(6)
Growing Agreement	Various	Various	Contract fee	67	—	—	—	—	67	(7)
				$ 1,461	$ 1,585	$ 1,310	$ 1,310	$ 1,510	$ 7,176	

(1) Exclusive agreement with the Company with respect to the *Cannabis Sativa L.* plant (the "Field"). The initial term of the agreement is five years with an option for an additional two years. The aggregate cost of the agreement over the initial term is $6,000. The Company will exclusively own all results and all intellectual property relating to the results of the collaboration with KeyGene (the "Results”). The Company will pay royalties in varying amounts to KeyGene relating to the Company's commercialization in the Field of certain Results. The Company has granted KeyGene a license to commercialize the Results outside of the Field and KeyGene will pay royalties in varying amounts to the Company relating to KeyGene's commercialization outside of the Field of the Results. On April 30, 2021, the Company and KeyGene entered into a First Amended and Restated Framework Collaborative Research Agreement. The First Amendment, described further in Note 15, lengthens the exclusively terms and adjusts the minimum commitment amounts shown in the table above.

(2) The license agreement also requires a milestone payment of $150 upon FDA approval or clearance of a product that uses the NCSU licensed technology. The annual royalty fee is credited against running royalties on sales of licensed products.

(3) The Company is also responsible for reimbursing NSCU for actual third-party patent costs incurred, including capitalized patent costs and patent maintenance costs. These costs vary from year to year and the Company has certain rights to direct the activities that result in these costs.

(4) On September 11, 2020, the Company entered into a one-year Sponsored Project Agreement with NCSU for continued research of tobacco alkaloid formation.

(5) The Company is also responsible for the payment of certain costs, including, capitalized patent costs and patent maintenance costs, a running royalty on future net sales of products made from the sublicensed intellectual property, and a sharing of future sublicensing consideration received from sublicensing to third parties in all countries except for Canada. Anandia retains all patent rights, and is responsible for all patent maintenance, in Canada.

(6) On March 1, 2021, the Company entered into a 14 month research agreement with Cannametrix for hemp/cannabis product development, formulation, and validation.

(7) Various R&D growing agreements for hemp / cannabis and tobacco.

Investment in Panacea **-** On December 3, 2019, the Company entered into an agreement to obtain a 15.8% ownership in Panacea. The Company paid Panacea $12,000 in cash and issued shares of 22nd Century common stock with a fair value of $1,297. The agreement with Panacea also requires the Company to purchase 5,333,334 shares of puttable preferred stock at $1.875 when Panacea achieves certain twelve-month sales targets—payable in cash of $8,500 and the remainder in common stock of the Company. The Company recently entered into a non-binding agreement with Panacea which would include an amendment of transaction documents to remove any future investment rights and obligations of the Company. See Note 5 for further information regarding the Company’s investment in Panacea.

Modified Risk Tobacco Product Application ("MRTP Application") – In connection with the Company's MRTP Application for its Very Low Nicotine Content ("VLNC") cigarettes with the FDA, the Company has entered in various contracts with third-party service providers to fulfill various requirements of the MRTP Application. Such contracts include services for clinical trials, perception studies, legal guidance, product testing, and consulting expertise. During the three months ended March 31, 2021, the Company incurred expenses relating to these contracts in the approximate amount of $12 and $149 for the three months ended March 31, 2020, respectively. The Company will continue to incur consulting and legal expenses as the MRTP Application continues through the FDA review process. The Company cannot currently quantify the additional expenses that the Company will incur in the FDA review process because it will involve various factors that are within the discretion and control of the FDA.

Litigation - In accordance with applicable accounting guidance, the Company establishes an accrued liability for litigation and regulatory matters when those matters present loss contingencies that are both probable and estimable. In such cases, there may be an exposure to loss in excess of any amounts accrued. When a loss contingency is not both probable and estimable, the Company does not establish an accrued liability. As a litigation or regulatory matter develops, the Company, in conjunction with any outside counsel handling the matter, evaluates on an ongoing basis whether such matter presents a loss contingency that is probable and estimable. If, at the time of evaluation, the loss contingency related to a litigation or regulatory matter is not both probable and estimable, the matter will continue to be monitored for further developments that would make such loss contingency both probable and estimable. When a loss contingency related to a litigation or regulatory matter is deemed to be both probable and estimable, the Company will establish an accrued liability with respect to such loss contingency and record a corresponding amount of related expenses. The Company will then continue to monitor the matter for further developments that could affect the amount of any such accrued liability.

Class Action

On January 21, 2019, Matthew Jackson Bull, a resident of Denver, Colorado, filed a Complaint against the Company, the Company's then Chief Executive Officer, Henry Sicignano III, and the Company's then Chief Financial Officer, John T. Brodfuehrer, in the United States District Court for the Eastern District of New York entitled: Matthew Bull, Individually and on behalf of all others similarly situated, v. 22nd Century Group, Inc., Henry Sicignano III, and John T. Brodfuehrer, Case No. 1:19 cv 00409.

On January 29, 2019, Ian M. Fitch, a resident of Essex County Massachusetts, filed a Complaint against the Company, the Company's then Chief Executive Officer, Henry Sicignano III, and the Company's then Chief Financial Officer, John T. Brodfuehrer, in the United States District Court for the Eastern District of New York entitled: Ian Fitch, Individually and on behalf of all others similarly situated, v. 22nd Century Group, Inc., Henry Sicignano III, and John T. Brodfuehrer, Case No. 2:19 cv 00553.

On May 28, 2019, the plaintiff in the Fitch case voluntarily dismissed that action. On August 1, 2019, the Court in the Bull case issued an order designating Joseph Noto, Garden State Tire Corp, and Stephens Johnson as lead plaintiffs.

On September 16, 2019, pursuant to a joint motion by the parties, the Court in the Bull case transferred the class action to federal district court in the Western District of New York, where it remains pending as Case No. 1:19-cv-01285.

Plaintiffs in the Bull case filed an Amended Complaint on November 19, 2019 that alleges three counts: Count I sues the Company and Messrs. Sicignano and Brodfuehrer and alleges that the Company's quarterly and annual reports, SEC filings, press releases and other public statements and documents contained false statements in violation of Section 10(b) of the Securities Exchange Act and Rule 10b-5; Count II sues Messrs. Sicignano and Brodfuehrer pursuant to Section 10(b) of the Securities Exchange Act and Rule 10b5(a) and (c); and Count III sues Messrs. Sicignano and Brodfuehrer for the allegedly false statements pursuant to Section 20(a) of the Securities Exchange Act. The Amended Complaint seeks to certify a class, and unspecified compensatory and punitive damages, and attorney's fees and costs.

On January 29, 2020, the Company and Messrs. Sicignano and Brodfuehrer filed a Motion to Dismiss the Amended Complaint. On July 31, 2020, the Court heard oral arguments on the motion to dismiss. On January 14, 2021, the Court granted motion, dismissing all claims with prejudice. The Plaintiffs filed a notice of appeal on February 12, 2021 to the Second Circuit Court of Appeals. The Second Circuit has granted an expedited briefing schedule and Plaintiff's/Appellant's was filed on April 12, 2021 and the Company's must be filed no later than May 17, 2021.

We believe that the claims are frivolous, meritless and that the Company and Messrs. Sicignano and Brodfuehrer have substantial legal and factual defenses to the claims. We intend to vigorously defend the Company and Messrs. Sicignano and Brodfuehrer against such claims.

Shareholder Derivative Cases

On February 6, 2019, Melvyn Klein, a resident of Nassau County New York, filed a shareholder derivative claim against the Company, the Company's then Chief Executive Officer, Henry Sicignano III, the Company's Chief Financial Officer, John T. Brodfuehrer, and each member of the Company's Board of Directors in the United States District Court for the Eastern District of New York entitled: Melvyn Klein, derivatively on behalf of 22nd Century Group v. Henry Sicignano, III, Richard M. Sanders, Joseph Alexander Dunn, Nora B. Sullivan, James W. Cornell, John T. Brodfuehrer and 22nd Century Group, Inc., Case No. 1:19 cv 00748. Mr. Klein brings this action derivatively alleging that (i) the director defendants supposedly breached their fiduciary duties for allegedly allowing the Company to make false statements; (ii) the director defendants supposedly wasted corporate assets to defend this lawsuit and the other related lawsuits; (iii) the defendants allegedly violated Section 10(b) of the Securities Exchange Act and Rule 10b 5 promulgated thereunder for allegedly approving or allowing false statements regarding the Company to be made; and (iv) the director defendants allegedly violated Section 14(a) of the Securities Exchange Act and Rule 14a 9 promulgated thereunder for allegedly approving or allowing false statements regarding the Company to be made in the Company's proxy statement.

On February 11, 2019, Stephen Mathew filed a shareholder derivative claim against the Company, the Company's then Chief Executive Officer, Henry Sicignano III, the Company's Chief Financial Officer, John T. Brodfuehrer, and each member of the Company's Board of Directors in the Supreme Court of the State of New York, County of Erie, entitled: Stephen Mathew, derivatively on behalf of 22nd Century Group, Inc. v. Henry Sicignano, III, John T. Brodfuehrer, Richard M. Sanders, Joseph Alexander Dunn, James W. Cornell, Nora B. Sullivan and 22nd Century Group, Inc., Index No. 801786/2019. Mr. Mathew brings this action derivatively generally alleging the same allegations as in the Klein case. The Complaint seeks declaratory relief, unspecified monetary damages, corrective corporate governance actions, and attorney's fees and costs. On August 15, 2019, the Court consolidated the Mathew and Klein actions pursuant to a stipulation by the parties (Western District of New York, Case No. 1-19-cv-0513). We believe that the claims are frivolous, meritless and that the Company and the individual defendants have substantial legal and factual defenses to the claims. We intend to vigorously defend the Company and the individual defendants against such claims.

On June 10, 2019, Judy Rowley filed a shareholder derivative claim against the Company, the Company's then Chief Executive Officer, Henry Sicignano III, the Company's Chief Financial Officer, John T. Brodfuehrer, and each member of the Company's Board of Directors in the Supreme Court of the State of New York, County of Erie, entitled: Judy Rowley, derivatively on behalf of 22nd Century Group, Inc. v. Henry Sicignano, III, Richard M. Sanders, Joseph Alexander Dunn, Nora B. Sullivan, James W. Cornell, John T. Brodfuehrer, and 22nd Century Group, Inc., Index No. 807214/2019. Ms. Rowley brings this action derivatively alleging that the director defendants supposedly breached their fiduciary duties by allegedly allowing the Company to make false statements. The Complaint seeks declaratory relief, unspecified monetary damages, corrective corporate governance actions, and attorney's fees and costs. We believe that the claims are frivolous, meritless and that the Company and the individual defendants have substantial legal and factual defenses to the claims. We intend to vigorously defend the Company and the individual defendants against such claims. On September 13, 2019, the Court ordered the litigation stayed pursuant to a joint stipulation by the parties.

On January 15, 2020, Kevin Broccuto filed a shareholder derivative claim against the Company, the Company's then Chief Executive Officer, Henry Sicignano III, the Company's Chief Financial Officer, John T. Brodfuehrer, and certain members of the Company's prior Board of Directors in the District Court of the State of Nevada, County of Clark, entitled: Kevin Broccuto, derivatively on behalf of 22nd Century Group, Inc. v. James W. Cornell, Richard M. Sanders, Nora B. Sullivan, Henry Sicignano, III, and John T. Brodfuehrer, Case No. A-20-808599. Mr. Broccuto brings this action derivatively alleging three counts: Count I alleges that the defendants breached their fiduciary duties; Count II alleges they committed corporate waste; and Count III that they were unjustly enriched, by allegedly allowing the Company to make false statements.

On February 11, 2020, Jerry Wayne filed a shareholder derivative claim against the Company, the Company's then Chief Executive Officer, Henry Sicignano III, the Company's Chief Financial Officer, John T. Brodfuehrer, and certain members of the Company's prior Board of Directors in the District Court of the State of Nevada, County of Clark, entitled: Jerry Wayne, derivatively on behalf of 22nd Century Group, Inc. v. James W. Cornell, Richard M. Sanders, Nora B. Sullivan, Henry Sicignano, III, and John T. Brodfuehrer, Case No. A-20-

808599. Mr. Wayne brings this action derivatively alleging generally the same allegations as the Brocutto case. The Complaint seeks unspecified monetary damages, corrective corporate governance actions, disgorgement of alleged profits and imposition of constructive trusts, and attorney's fees and costs. The Complaint also seeks to declare as unenforceable the Company's Bylaw requiring derivative lawsuits to be filed in Erie County, New York, where the Company is headquartered.

On March 25, 2020, the Court ordered the Brocutto and Wayne cases consolidated and stayed pursuant to a joint stipulation from the parties. We believe that the claims are frivolous, meritless and that the Company and the individual defendants have substantial legal and factual defenses to the claims. We intend to vigorously defend the Company and the individual defendants against such claims.

NOTE 12 – EQUITY- BASED COMPENSATION

On April 12, 2014, the stockholders of the Company approved the 22nd Century Group, Inc. 2014 Omnibus Incentive Plan (the “OIP”) and the authorization of 5,000,000 shares to be reserved for issuance thereunder. On April 29, 2017, the stockholders approved an amendment to the OIP to increase the number of shares available for issuance by an additional 5,000,000 shares and on May 3, 2019, the stockholders approved an additional amendment to the OIP to increase the number of shares available for issuance by an additional 5,000,000 shares. The OIP allows for the granting of equity and cash incentive awards to eligible individuals over the life of the OIP, including the issuance of up to an aggregate of 15,000,000 shares of the Company’s common stock pursuant to awards under the OIP. The OIP has a term of ten years and is administered by the Compensation Committee of the Company’s Board of Directors to determine the various types of incentive awards that may be granted to recipients under the OIP and the number of shares of common stock to underlie each such award under the OIP. As of March 31, 2021, the Company had available 1,979,059 shares remaining for future awards under the OIP. The Company is also seeking shareholder approval of the 22nd Century Group, Inc. 2021 Omnibus Incentive Plan (the “Plan”) to authorize 5,000,000 shares of our common stock for issuance under the Plan to meet our compensation goals for current and future years. Our Board of Directors has adopted the Plan contingent on stockholder approval.

Restricted Stock (“RSU”). We grant restricted stock units to employees and non-employee directors which are valued based on the Company’s stock price on the award grant date. The following table summarizes the changes in unvested restricted stock from December 31, 2020 through March 31, 2021.

	Unvested RSUs	
	Number of Shares in thousands	**Weighted Average Grant-date Fair Value $ per share**
Unvested at December 31, 2020	2,938	$ 0.85
Granted	1,995	$ 3.20
Vested	(1,234)	$ 0.85
Forfeited	(216)	$ 0.67
Unvested at March 31, 2021	3,483	$ 2.21

The fair value of RSUs that vested during the three months ended March 31, 2021 was approximately $3,600 based on the stock price at the time of vesting.

Stock Options. Our outstanding stock options were valued using the Black-Scholes option-pricing model on the date of the award. A summary of all stock option activity since December 31, 2020 is as follows:

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	Number of Options	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term	Aggregate Intrinsic Value
	in thousands	$ per share		
Outstanding at December 31, 2020	6,581	$ 1.50		
Granted	235	$ 3.10		
Exercised	(846)	$ 1.36		
Expired	(6)	$ 2.76		
Outstanding March 31, 2021	5,964	$ 1.59	4.3 years	$ 7,480
Exercisable at March 31, 2021	5,028	$ 1.56	4.1 years	$ 8,144

The intrinsic value of a stock option is the amount by which the current market value or the market value upon exercise of the underlying stock exceeds the exercise price of the option.

The weighted average of fair value assumptions used in the Black-Scholes option-pricing model for such grants were as follows:

	2021
Risk-free interest rate (1)	0.54 %
Expected dividend yield (2)	— %
Expected volatility (3)	87.92 %
Expected term of stock options (4)	4.09 years

(1) The risk-free interest rate is based on the period matching the expected term of the stock options based on the U.S. Treasury yield curve in effect on the grant date.
(2) The expected dividend yield is assumed as zero. The Company has never paid cash dividends nor does it anticipate paying dividends in the foreseeable future.
(3) The expected volatility is based on historical volatility of the Company's stock.
(4) The expected term represents the period of time that options granted are expected to be outstanding based on vesting date and contractual term.

Restricted Stock and Stock Option Compensation Expense. The Company recognized the following compensation costs, net of actual forfeitures, related to restricted stock and stock options:

	Three Months Ended March 31, 2021	Three Months Ended March 31, 2020
Sales, general, and administrative	$ 480	$ 440
Research and Development	27	41
Total restricted stock and stock option compensation	$ 507	$ 481

As of March 31, 2021, unrecognized compensation expense amounted to $7,765 which is expected to be recognized over a weighted average period of approximately 1.4 years. In addition, there is approximately $637 of unrecognized stock option compensation expense that requires the achievement of certain milestones which have yet to be obtained.

NOTE 13. – REVENUE RECOGNITION

The Company recognizes revenue when it satisfies a performance obligation by transferring control of the product to a customer. The Company's customer contracts consist of obligations to manufacture the customer's branded filtered cigars and cigarettes. For certain contracts, the performance obligation is satisfied over time as the Company determines, due to contract restrictions, it does not have an alternative use of the product and it has an enforceable right to payment as the product is manufactured. The Company recognizes revenue under those contracts at the unit price stated in the contract based on the units

manufactured. Revenue from the sale of the Company's products is recognized net of cash discounts, sales returns and allowances. There was no allowance for discounts or returns and allowances at March 31, 2021 and December 31, 2020.

Contract Assets and Liabilities

Unbilled receivables (contract assets) represent revenues recognized for performance obligations that have been satisfied but have not been billed. These receivables are included as Accounts receivable, net on the Consolidated Balance Sheets. Customer payment terms vary depending on the terms of each customer contract, but payment is generally due prior to product shipment or within extended credit terms up to twenty-one (21) days after shipment. Deferred Revenue (contract liabilities) relate to down payments received from customers in advance of satisfying a performance obligation. This deferred revenue is included as Deferred income on the Consolidated Balance Sheets.

Total contract assets and contract liabilities are as follows:

	March 31, 2021	December 31, 2020
Unbilled receivables	$ 53	$ 349
Deferred Revenue	—	(272)
Net contract assets	$ 53	$ 77

Disaggregation of Revenue

The Company's net sales revenue is derived from customers located primarily in the United States of America and is disaggregated by the timing of revenue recognition—net sales transferred over time and net sales transferred at a point in time. All revenue is related to contract manufacturing.

	Three Months Ended March 31,	
	2021	2020
Net sales-over time	$ 4,512	$ 4,357
Net sales-point in time	2,294	2,701
Total Revenue	$ 6,806	$ 7,058

NOTE 14. – EARNINGS PER SHARE

The following table sets forth the computation of basic and diluted earnings (loss) per common share for the three months ended March 31, 2021 and 2020, respectively. Outstanding warrants, options, and restricted stock units were excluded from the calculation of diluted EPS as the effect was antidilutive.

	Three Months Ended March 31,	
	2021	2020
	(in thousands, except for per-share data)	
Net loss	$ (5,030)	$ (4,028)
Weighted average common shares outstanding - basic and diluted	144,258	138,610
Net loss per common share - basic and diluted	$ (0.03)	$ (0.03)
Anti-dilutive shares are as follows:		
Warrants	—	11,293
Options	5,964	7,837
Restricted stock units	3,483	2,938
	9,447	22,068

NOTE 15. – SUBSEQUENT EVENTS

On April 30, 2021, 22nd Century Group, Inc. (the "Company") and KeyGene N.V. ("KeyGene") entered into a First Amended and Restated Framework Collaborative Research Agreement (the "Amended Agreement") which amends and restates the terms of that certain Framework Collaborative Research Agreement entered into between the two companies on April 3, 2019 (the "FCRA"), under which KeyGene agreed to work exclusively with the Company with respect to the *Cannabis Sativa L.* plant and all uses thereof (the "Field"). The Amended Agreement provides for certain strategic business term modifications to the FCRA, including:

(i) a 3-year extension of the agreement term, from first-quarter 2024 to first-quarter 2027, and preserves the Company's option for an additional 2-year extension, now through first quarter 2029;

(ii) a reduction of the 2021-2022 (Contract Year 3) spending commitment to $800. The annual spending commitment will be $1,200 thereafter and will be increased by 3% per annum beginning in 2025-2026 (Contract Year 6);

(iii) the addition of a framework and exclusivity guidelines for a future Master Development Agreement related to other plant varieties; and

(iv) the establishment of an Executive Committee, comprised of members from both the Company and KeyGene, to focus on strategic development of the research partnership.

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations

Forward Looking Statements

Except for historical information, all of the statements, expectations, and assumptions contained in this section are forward-looking statements. Forward-looking statements typically contain terms such as "anticipate," "believe," "consider," "continue," "could," "estimate," "expect," "explore," "foresee," "goal," "guidance," "intend," "likely," "may," "plan," "potential," "predict," "preliminary," "probable," "project," "promising," "seek," "should," "will," "would," and similar expressions. Actual results might differ materially from those explicit or implicit in forward-looking statements. Important factors that could cause actual results to differ materially are set forth in "Risk Factors" in our Annual Report on Form 10-K filed on March 11, 2021. We undertake no obligation to publicly update or revise any forward-looking statement as a result of new information, future events, or otherwise, except as otherwise required by law. All information provided in this quarterly report is as of the date hereof, and we assume no obligation to and do not intend to update these forward-looking statements, except as required by law.

For purposes of this Management's Discussion and Analysis of Financial Condition and Results of Operations, references to the "Company," "we," "us" or "our" refer to the operations of 22nd Century Group, Inc. and its direct and indirect subsidiaries for the periods described herein.

Overview

22nd Century Group, Inc. is a biotechnology company developing disruptive, plant-based solutions for the life science, consumer product, and pharmaceutical markets. We are focused on technology that allows us to modulate the level of nicotine and other nicotinic alkaloids in tobacco plants and the levels of cannabinoids and terpenes in hemp/cannabis plants through genetic engineering and modern plant breeding techniques. Our mission in tobacco is to reduce the harm caused by smoking by introducing adult smokers to our proprietary, Very Low Nicotine Content ("VLNC") tobacco and cigarettes, which contains 95% less nicotine than conventional tobacco and cigarettes. Our mission in hemp/cannabis is to develop proprietary varieties of hemp with valuable cannabinoid and terpene profiles and other superior agronomic traits, with potential applications in life sciences and consumer products. We have a significant intellectual property portfolio of issued patents and patent applications relating to both tobacco and hemp/cannabis plants.

In tobacco, we have developed unique and proprietary bright and burley VLNC tobaccos that grow with at least 95% less nicotine than tobacco used in conventional cigarettes. In the year 2011, we developed our SPECTRUM® research cigarettes in collaboration with independent researchers, officials from the FDA, the National Institute on Drug Abuse ("NIDA"), which is part of the National Institutes of Health ("NIH"), the National Cancer Institute ("NCI"), and the Centers for Disease Control and Prevention

(“CDC”). Since 2011, we have provided more than 31.6 million variable nicotine research cigarettes for use in numerous independent clinical studies with agencies of the United States federal government. These independent clinical studies are estimated to have been performed at a cost of more than $125 million. The results of these independent clinical studies have been published in peer-reviewed publications (including the New England Journal of Medicine, the Journal of the American Medical Association, and many others). The results of these studies indicate that our VLNC tobaccos have been associated with reductions in smoking, nicotine exposure and nicotine dependence with little to no evidence of compensatory smoking and without serious adverse events. A list of completed and published clinical studies using cigarettes made with our VLNC tobaccos is shown on our website at https://www.xxiicentury.com/vln-clinical-studies/published-clinical-studies-on-very-low-nicotine-content-vlnc-cigarettes. A list of on-going clinical studies using our SPECTRUM® research cigarettes is shown on our website at https://www.xxiicentury.com/vln-clinical-studies/on-going-clinical-studies-on-very-low-nicotine-content-vlnc-cigarettes. We do not incorporate third party studies or the information on our website into this Annual Report on Form 10-Q.

In hemp, we are developing proprietary hemp varieties with increased levels of certain cannabinoids and other desirable agronomic traits with the goal of generating new and valuable intellectual property and plant lines. Our activities in the United States involve only work with legal hemp in full compliance with U.S. federal and state laws. The hemp and the marijuana plants are both part of the same cannabis genus, except that hemp does not have more than 0.3% dry weight content of delta-9-tetrahydrocannabinol (“THC”). While 2018 Farm Bill legalized hemp and cannabinoids extracted from hemp in the U.S., such extracts remain subject to state laws and regulation by other U.S. federal agencies such as the FDA, U.S. Drug Enforcement Administration (“DEA”), and the U.S. Department of Agriculture (“USDA”). The same plant, with a higher THC content is marijuana, which is legal under certain state laws but not yet legal under U.S. federal law. The similarities between these plants can cause confusion. To reflect this difference in law, sometimes we refer to legal hemp and the legal hemp industry as hemp/cannabis to distinguish this as being separate and apart from marijuana/cannabis which is not legal under U.S. federal law. Our activities with legal hemp have sometimes been incorrectly perceived as us being involved in federally illegal marijuana/cannabis. This is not the case. In the United States, we work only with legal hemp in full compliance with federal and state laws.

Additional information about our business and operations is contained in our Annual Report on Form 10-K for the year ended December 31, 2020.

Executive Overview of First Quarter 2021 Results

Key Business and Financial Highlights

- Securing Modified Risk Tobacco Product (MRTP) authorization for VLN® remains our number one priority and we are confident that the FDA is in the final stages of the review process related to our application. There are no outstanding requests for information from the FDA. We are working to ensure that the launch of our VLN® King and VLN® Menthol King cigarettes occur within 90 days of receiving MRTP designation.
- We have now secured four out of the five key partnerships needed to maximize each component in the upstream segment of the hemp/cannabis value chain. These partnerships will enable us to accelerate the new development of valuable, commercial hemp/cannabis lines and intellectual property to market.
- Net sales revenue for the first quarter of 2021 was $6.8 million and comparable to the first quarter of 2020 at $7.1 million.
- Gross profit for the first quarter of 2021 improved by $360 thousand year-over-year to $647 thousand.
- Net loss for the first quarter of 2021 was $5.0 million compared to $4.0 million in the same quarter last year, an increase in the net loss of $1.0 million.

Corporate Business Highlights

- On January 19, 2021, we announced the dismissal with prejudice of the federal securities class action lawsuit captioned Noto. V. 22nd Century Group, Inc., 19-CV-1285 by a federal district court in the Western District of New York on January 14, 2021. The case was initially filed in the Eastern District of New York, where it was captioned Bull v. 22nd Century Group, Inc. 1:19-CV-00409. In denying the Plaintiffs’ request for an opportunity to file another amended Complaint, the Court held that “further amendment would be futile.”

- On January 28, 2021, we announced that we are moving our corporate headquarters to the up-and coming Larkinville District in downtown Buffalo and we recently moved in during April 2021. Our new Buffalo office space is in a state-of-the-art, restored manufacturing facility located at 500 Seneca Street, joining other multinational technology and professional services companies. Our new headquarters will accommodate all of our staff from our current office location in nearby Williamsville and has significant room for expansion.
- During February and March of 2021, our warrant holders exercised 11,293,211 warrants for cash in exchange for common stock. In connection with these exercises, we received net proceeds of $11.8 million.
- On May 4, 2021, we announced an agreement to extend and expand our plant research partnership agreement with KeyGene, a global leader in plant research involving high-value genetic traits and increased crop yields. The new partnership agreement extends the length of the collaboration we have with KeyGene to develop new, disruptive hemp/cannabis plants and intellectual property for the life science, medicinal, and pharmaceutical end-use markets. It also expands the partnership to include research and development activity for non-combustible, alternative tobacco plant applications, such as protein production, and our third plant franchise.

Tobacco Franchise Highlights and Notable Accomplishments

- We believe that our proprietary, reduced nicotine content cigarettes, VLN®, have massive global market opportunity. In 2018, the global tobacco market was worth $817 billion and of that, $714 billion, or approximately 90% of the global tobacco market is comprised of combustible cigarettes. There are more than 1 billion global and 34 million U.S. adult smokers. More than two-thirds of adult smokers want to quit, yet less than ten percent of them are able to quit successfully. We believe that smokers are actively seeking alternatives to addictive combustible cigarettes. Based on our consumer perception studies, 60% of adult smokers indicate a likelihood to use VLN®.
- Our VLN® cigarettes contain 95% less nicotine than conventional cigarettes and are a familiar combustible product format that replicates the conventional cigarette experience, including the sensory and experiential elements of taste, scent, smell, and “hand-to-mouth” behavior. VLN® contains 0.5 milligrams of nicotine per gram of tobacco, an amount cited by the FDA, based on clinical studies, to be “minimally or non-addictive”. The lack of reward from nicotine creates a dissociation between the act of smoking and nicotine which helps adult smokers reduced the harm caused by smoking.
- Since 2011, our reduced nicotine content cigarettes have been used in more than 50 independent scientific clinical studies by universities and institutions. The studies, using our reduced nicotine content tobacco cigarettes, show that smokers who use our products: (i) reduce their nicotine exposure and dependence, (ii) smoke fewer cigarettes per day, (iii) increase their number of smoke-35 free days, and (iv) double their quit attempts – all with minimal or no evidence of nicotine withdrawal or compensatory smoking.
- In December 2019, the FDA granted a Premarket Tobacco Application (“PMTA”) authorization for our reduced nicotine content cigarettes, giving us the ability to sell the product. In order to market our reduced nicotine content cigarettes under the brand name VLN®, with pack and advertising claims stating that the product contains 95% less nicotine than conventional tobacco cigarettes, as well as related claims regarding nicotine exposure, we will need to secure an MRTP authorization from the FDA.
- As a part of the MRTP application process, on February 14, 2020, we presented our MRTP application for our reduced nicotine content cigarettes, VLN® to the FDA’s Tobacco Products Scientific Advisory Committee (TPSAC) and passed one of the final regulatory milestones. On April 17, 2020, the FDA set May 18, 2020, as the deadline for the submission of public comments on our MRTP application. The public comment period is now closed, and we believe that we are in the final stages of the review and decision-making process.
- We were and remain focused on our primary mission and highest, near-term priority of securing MRTP authorization for our proprietary, reduced nicotine content tobacco cigarettes, VLN®. The designation will allow us to communicate key features of the VLN® products, including the headline claim of “95% less nicotine.” We continue to steadily increase our advocacy activities and engage in conversations at the highest levels of the Administration, Congress, and the FDA about VLN®, and every indication is that the MRTP application is in the final stages of review with the FDA. In addition to our ongoing contact with the FDA, we have been and continue to work with various legal advisers, regulatory consultants, and government affairs specialists to highlight the public health importance of the MRTP application to encourage a near-term authorization of its application.
- We are prepared to launch sales of VLN® within 90 days of receiving FDA’s MRTP designation and are in advanced discussions with potential independent, regional, and national distribution and retail partners. We anticipate a phased rollout of VLN® in

select geographies and plan to position VLN® in the premium pricing segment of the cigarette market. On January 11, 2021, we announced that we will expand our growing program and increase planting in the 2021 crop year for VLN® reduced nicotine content tobacco. This new planting for VLN® tobacco is in addition to our current VLN® inventory, which is earmarked for the launch and initial sales of VLN®.

- On April 15, 2021, we announced that we stand fully prepared to help New Zealand to reach its goal to be a smoke-free nation by 2025. Our VLN® cigarettes contain just 0.5 milligrams of nicotine per gram of tobacco, 95% less nicotine than conventional cigarette brands, which is in line with the New Zealand proposal. We initially engaged with the public health researchers in New Zealand in 2016, when the country announced its goal of becoming smoke-free, leading the New Zealand Medical Journal to publish a letter recommending our reduced nicotine content cigarettes as an "important smoking reduction tool."
- We are fully prepared to manufacture enough VLN® to secure its market position. We own and operate a fully credentialed 62,000 square foot facility in North Carolina. Our capacity is currently approximately 1% of the U.S. cigarette market volume. With minimal investment, we believe that we can triple that capacity to 3%.
- Our research cigarettes, SPECTRUM®, continue to fuel numerous independent, scientific studies to validate the enormous public health benefit identified by the FDA and others of implementing a national standard requiring all cigarettes to contain "minimally or non-addictive" levels of nicotine. In December 2020, the FDA in coordination with the National Institute on Drug Abuse (NIDA) and others, submitted an order to us for 3.6 million variable nicotine research cigarettes. On April 26, 2021, we announced fulfillment of the order bringing the total number of research cigarettes provided for public health research to more than 31 million cigarettes.
- On May 5, 2021, we announced that we are internalizing our nicotine content testing capabilities to increase our ability to rapidly conduct high-precision analysis of our VLN® cigarettes and other nicotine products. We are making the investment now to be well-positioned for the FDA authorization of our MRTP application.
- We believe that recent political changes will likely be favorable to our business prospects from a policy priority and regulatory standpoint. Under the new administration, we believe that the FDA will refocus on implementing its ground-breaking Comprehensive Plan for Tobacco and Nicotine Regulation, in particular the agency's plan to cap the amount of nicotine in combustible cigarettes to a "minimally or non-addictive" level. We believe that the MRTP authorization and the launch of VLN® will serve as a starting point for the FDA's proposed mandate.
- We believe that our next generation, non-GMO, plant research is the key to commercializing our reduced nicotine content tobacco and technology in international markets. Non-GMO products are critical for success in international markets where non-GMO products are preferred, or GMO products are banned. We continue to make progress in our non-GMO tobacco research. In partnership with North Carolina State University, have completed successful research field trials that have validated new non-GMO methodologies for reducing nicotine in tobacco plants and have consistently achieved reductions in nicotine levels by as much as 99%. During the fourth quarter of 2020, we announced that we were granted a new U.S. patent, No. 10,669,552, entitled "Up-regulation of auxin response factor NbTF7", related to the reduction of nicotine in the tobacco plant. The new technology provides us with a rapid pathway to introduce very low nicotine traits into virtually any variety of tobacco, including bright, burley, and oriental tobacco varieties. We have successfully applied our non-GMO technology to bright and burley varieties of tobacco and have developed a VLN® 2.0 prototype cigarette. We are also using our non-GMO technology to introduce reduced nicotine traits into oriental varieties of tobacco.

Hemp/Cannabis Franchise Highlights and Notable Accomplishments

- We continue to place an emphasis on our hemp/cannabis strategy to target the upstream segments of the cannabinoid value chain in the areas of plant biotechnology research, gene modification and engineering, modern plant breeding and development, and extraction. We believe that we can differentiate ourselves in the hemp/cannabis industry by building upon our core strength and expertise in plant science and the ingredient value chain and through our strategic, operational partnerships, including the addition of our new partner, CannaMetrix.

  We continue to shift our focus away from the already saturated U.S. consumer market of cannabidiol (CBD) and hemp-based products and expect to gain ingredient cultivation capabilities and extraction and purification services through a non-binding agreement with Panacea, which is expected to provide us with operational assets, including a farm and various extraction and distillation equipment.

- We developed and launched a new, cutting-edge technology platform that will enable us and our strategic partners to quickly identify and incorporate commercially valuable traits of hemp/cannabis plants to create new, stable hemp/cannabis lines. The platform, developed in collaboration with researchers at KeyGene, incorporates a suite of proprietary molecular tools and a large library of genomic markers and gene-trait correlations. We have already characterized millions of high-value single nucleotide polymorphisms (SNPs). By targeting these newly identified SNPs, we have been able to locate and isolate specific sections of genetic code from genome assemblies present in our state-of-the-art hemp/cannabis bioinformatics database. This breakthrough enables us to quickly and easily identify the genes responsible for specific traits in a plant and is a powerful tool for us and the hemp/cannabis industry. We have already begun discussions to license this platform to strategic partners to help them improve their plant breeding techniques and optimize their hemp/cannabis lines.
- We continue to secure commercially, valuable patents and intellectual property through our internal research capabilities and external research partnerships. We were recently granted a new U.S. Patent No. 10,787,674 B2 entitled “Trichome specific promoters for the manipulation of cannabinoids and other compounds in glandular trichomes”. This new intellectual property enables us to develop and deliver new hemp/cannabis plants that are designed to produce cannabinoids more efficiently by activating the molecular promoters, “on/off switches,” specifically and only in the plant’s trichomes where the majority of cannabinoids are produced. The patent application describes eight promoters, which are essentially molecular on/off switches, covering all of the major steps in the cannabinoid biosynthesis pathway and is related to the control of cannabinoid and terpene production.
- We have secured an exclusive agreement with CannaMetrix, LLC for the use of their proprietary, human cell-based testing CannaMetrix EC50Array™ technology that will enable us to accelerate the commercialization of new, disruptive hemp/cannabis plant lines and intellectual property. CannaMetrix’s proprietary CannaMetrix EC50Array™ technology serves as a high-throughput roadmap for developing new hemp/cannabis plant lines with tailor-made cannabinoid and terpenoid profiles for use in the life science, consumer product, and pharmaceutical markets. The human cell-based assay has the ability to measure and validate the potency and efficacy of cannabinoids and/or terpenoids through defined biomarkers and receptor activity and can rapidly identify optimum plant profiles by measuring the potency and effect on the human cell system.
- We have secured a number of the key partnerships needed to maximize our work in the upstream segments of the cannabinoid value chain, and vertically integrate our hemp/cannabis capabilities. The combination of our core strengths in plant science and our network of key partnerships will enable us to drive differentiation and value by delivering new, disruptive plant lines and IP.

2021 Priorities and Areas of Focus

1. We remain focused on securing FDA authorization for VLN®. Starting within 90-days of authorization of our MRTPA by the FDA, we are prepared to launch VLN® cigarettes in select markets.
2. We believe that an equally important first priority initiative is for us to support and advance the FDA’s plan to require that all cigarettes sold in the U.S. be made “minimally or non-addictive” by limiting their nicotine content to just 0.5 milligrams of nicotine per gram of tobacco.
3. We continue to target the upstream segment of the cannabinoid value chain; creating proprietary, commercially valuable new plant lines and related intellectual property with stabilized genetics to harness and optimize hemp/cannabis plant potential. We will seek to monetize a portion of our existing hemp/cannabis IP in 2021 and will continue to bring disruptive technology forward.
4. We will turn attention to the development of a third, plant-based franchise after securing MRTP authorization for VLN®. We will leverage our plant science expertise to develop and secure valuable intellectual property and sign lucrative strategic partnerships to support the development of this franchise.
5. We will maintain diligent financial execution, efficient operating structure, and balance sheet strength to support our growth initiatives.

Results of Operations

Year-to-Date March, 31 2021 compared to Year-to-Date March 31, 2020.

Amounts in thousands, except for share and per-share data.

Revenue - Sale of products, net

	Year-to-Date	
	March 31 2021	March 31 2020
Sale of products, net	$ 6,806	$ 7,058
Dollar Change from Prior Year	$ (252)	

The decrease in sales revenue for the three months ended March 31, 2021, compared to the three months ended March 31, 2020, was primarily the result of decreased sales of contract manufactured cigarettes of $1,059. The decreased sales were primarily driven by volume decreases compared to the prior period. This was partially offset by increased contract manufactured filtered cigar sales of $127, and fulfillment of our SPECTRUM® cigarette order of $680 which did not occur in the prior period.

Cost of goods sold - Products / Gross profit (loss)

	Year-to-Date	
	March 31 2021	March 31 2020
Cost of goods sold	$ 6,159	$ 6,771
Percent of Product Sales	90.5 %	95.9 %
Dollar Change from Prior Year	$ (612)	

	Year-to-Date	
	March 31 2021	March 31 2020
Gross profit (loss)	$ 647	$ 287
Percent of Product Sales	9.5 %	4.1 %
Dollar Change from Prior Year	$ 360	

The increase in gross margin for the three months ended March 31, 2021, compared the three months ended March 31, 2020, was primarily due to fulfillment of our SPECTRUM® cigarette order and was partially offset by lower sales volume in contract manufacturing cigarettes and filtered cigars.

Research and development expense

	Year-to-Date	
	March 31 2021	March 31 2020
Research and Development	$ 689	$ 811
Percent of Product Sales	10.1 %	11.5 %
Dollar Change from Prior Year	$ (122)	

The decrease in R&D expense for the three months ended March 31, 2021, compared the three months ended March 31, 2020, was primarily due to lower personnel expense of $105 due to a more focused R&D headcount to accomplish our strategies. We continue to prioritize our R&D activities to achieve our strategic and investment priorities.

Research and development expense - MRTP

	Year-to-Date	
	March 31 2021	March 31 2020
Research and Development - MRTP	$ 12	$ 149
Percent of Product Sales	0.2 %	2.1 %
Dollar Change from Prior Year	$ (137)	

MRTP expenses for the three months ended March 31, 2021 declined significantly, as we submitted our MRTP application to the FDA during 2019. MRTP-related expenses for 2021 are primarily related to consulting services related to our application while 2020 are primarily related to our February 14, 2020 Tobacco Products Scientific Advisory Committee (TPSAC) hearing.

Sales, general and administrative expense

	Year-to-Date	
	March 31 2021	March 31 2020
Sales, general and administrative	$ 4,829	$ 3,141
Percent of Product Sales	71.0 %	44.5 %
Dollar Change from Prior Year	$ 1,688	

The increase in SG&A expense during the three months ended March 31, 2021, as compared to the prior year respective period, was driven by a $675 increase in personnel expenses, a $604 increase in insurance expenses, a $441 increase in investor relations expenses, and a $112 increase in marketing expenses primarily related to VLN® activities. We have deployed incremental SG&A spending to support our corporate management capabilities and to evaluate and prepare for future opportunities. These increases in SG&A were partially offset by lower legal fees of $283 compared to the prior year.

Depreciation expense

	Year-to-Date	
	March 31 2021	March 31 2020
Depreciation	$ 138	$ 156
Percent of Product Sales	2.0 %	2.2 %
Dollar Change from Prior Year	$ (18)	

The decrease in depreciation expense during the three months ended March 31, 2021, as compared to the prior year respective period, was primarily due to a lower property, plant, and equipment depreciable base primarily due to impairments taken for the Williamsville corporate office during the fourth quarter of 2020.

Amortization expense

	Year-to-Date	
	March 31 2021	March 31 2020
Amortization	$ 150	$ 172
Percent of Product Sales	2.2 %	2.4 %
Dollar Change from Prior Year	$ (22)	

The decrease in amortization expense during the three months ended March 31, 2021, as compared to the prior year respective period, was primarily due to a lower intangible asset depreciable base primarily due to impairments taken during 2020.

Unrealized gain (loss) on investment

	Year-to-Date	
	March 31 2021	March 31 2020
Unrealized gain (loss) on investments	$ 36	$ (445)
Percent of Product Sales	0.5 %	(6.3)%
Dollar Change from Prior Year	$ 481	

The warrants to purchase 81,164 shares of Aurora Cannabis, Inc ("Aurora") common stock are considered an equity security and are recorded at fair value. We recorded the fair value of the stock warrants of $275 at March 31, 2021, using the Black-Scholes pricing model, and recorded an unrealized gain on the warrants in the amount of $36 for the three months ended March 31, 2021, and an unrealized loss of $445 for the three months ended March 31, 2020.

Interest income, net

	Year-to-Date	
	March 31 2021	March 31 2020
Interest Income, net	$ 112	$ 612
Percent of Product Sales	1.7 %	8.7 %
Dollar Change from Prior Year	$ (500)	

Interest income, net (interest income less investment fees) for the three months ended March 31, 2021 is comprised of cash interest income of $67 and non-cash interest accretion of $45 which relates to our preferred stock investment in Panacea, and short-term investment securities purchased at a discount or premium. The decrease in interest income during the three months ended March 31, 2021, as compared to the prior year respective period, was primarily due to lower cash and non-cash interest income on our Panacea convertible note receivable ($173 and $93, respectively) as a result of a non-binding letter of intent to restructure our Panacea investment. See Note 5 to our consolidated financial statements included herein for additional information regarding our Panacea investment. Cash interest income, net on our short-term investment securities decreased $163 primarily due to lower bond interest yields and lower total short-term investment securities as of March 31, 2021, as compared to the prior year respective period.

Interest expense

	Year-to-Date	
	March 31 2021	March 31 2020
Interest Expense	$ (7)	$ (12)
Percent of Product Sales	(0.1)%	(0.2)%
Dollar Change from Prior Year	$ 5	

Interest expense for the three months ended March 31, 2021 was in line with the expense for the same prior year period.

Net loss

	Year-to-Date	
	March 31 2021	March 31 2020
Net Loss	$ (5,030)	$ (4,028)
Percent of Product Sales	(73.9)%	(57.1)%
Dollar Change from Prior Year	$ (1,002)	

The increase in net loss for the three months ended March 31, 2021, as compared to the same period during the prior year, was primarily the result of increased SG&A expense of $1,688 during the three months ended March 31, 2021, compared to the respective prior year period. This was partially offset by increased gross margin of $360, which was primarily due to fulfillment of our

SPECTRUM® cigarette order, decreased R&D expenses of $123, and decreased MTRP expenses of $138 compared to the respective prior year period.

Other Comprehensive Income (Loss)

	Year-to-Date March 31 2021	Year-to-Date March 31 2020
Other Comprehensive Income (Loss)	$ (32)	$ (193)
Percent of Product Sales	(0.5)%	(2.7)%
Dollar Change from Prior Year	$ 161	

We maintain an account for short-term investment securities that are classified as available-for-sale securities and consist of money market funds and corporate bonds with maturities greater than three months at the time of acquisition. Unrealized gains and losses on short-term investment securities (the adjustment to fair value) are recorded as other comprehensive income or loss. We recorded an unrealized loss on short-term investment securities in the amount of $32 resulting in other comprehensive loss of $32 for the three months ended March 31, 2021. For the three months ended March 31, 2020, we recorded an unrealized loss on short-term investment securities of $196 and recorded a reclassification of gains to net loss in the amount of $3, resulting in other comprehensive loss of $193.

Liquidity and Capital Resources

	Year-to-Date March 31 2021	Year-to-Date March 31 2020
Net cash provided by (used in) operating activities	$ (3,911)	$ (4,662)
Net cash provided by (used in) investing activities	(8,535)	4,896
Net cash provided by (used in) financing activities	12,689	—
Net increase (decrease) in cash and cash equivalents	243	234
Cash and cash equivalents - beginning of period	1,029	485
Cash and cash equivalents - end of period	$ 1,272	$ 719
Short-term investment securities	$ 29,671	$ 21,313

Working Capital

As of March 31, 2021, we had working capital of approximately $29,379 compared to working capital of approximately $20,998 at December 31, 2020, an increase of $8,381. This increase in working capital was primarily due to a $8,601 increase in cash, cash equivalents and short-term investment securities resulting from cash exercises of all of our outstanding warrants. The cash exercises eliminated all outstanding warrants and amounted to net cash proceeds of $11,782.

Net cash used in operating activities

The decrease of cash used in operations in the amount of $751 was due to a decrease in cash used for working capital components related to operations in the amount of $2,099 which was partially offset by an increase in the cash portion of the net loss in the amount of $1,348 for the three months ended March 31, 2021 as compared to the three months ended March 31, 2020.

Net cash provided by investing activities

The increase in cash used in investing activities, in the amount of $13,431, was primarily the result of an increase in the net cash used for our short-term investments in the amount of $13,422 and an increase in the cash used for acquisition of machinery and equipment in the amount of $92, as compared to the three months ended March 31, 2020. The increase in cash used in our short-term investments was primarily due to increased funds for investment, from Q1 2021 warrant exercises, while the increased cash used for acquisition of machinery and equipment was primarily due to new office furnishings and improvements at our newly relocated corporate headquarters.

Net cash provided by (used in) financing activities

During the three months ended March 31, 2021, cash provided by financing activities was $12,689 resulting from warrant exercises of $11,782 and option exercises of $1,153 which was partially offset by principal payments on our notes payable of $246.

Cash demands on operations

Our principal sources of liquidity are our cash and cash equivalents, short-term investment securities, and cash generated from our contract manufacturing business. As of March 31, 2021, we had approximately $30,943 of cash and cash equivalents and short-term investments which is an increase of $8,601 from December 31, 2020. This increase was primarily due to the cash exercise of our outstanding warrants. Our short-term investment securities along with sustained contract manufacturing sales provide sufficient resources for estimated contractual commitments, described further in Note 11, and normal cash requirements for operations for at least the next twelve months. In addition to the commitments described in Note 11 to our consolidated financial statements, we are currently in the process of securing contracts with select tobacco farmers to assist with the 2021 growing of our VLNC tobacco. These contacts, once finalized and executed, will increase the quantity of our current leaf inventory which will help support expected demand of VLN®, if MTRP authorization is granted by the FDA. The cost of such growing efforts is dependent on the final agricultural yields and leaf quality, but we expect the cost to range between $1.5 million and $1.9 million. We also believe that we have appropriate liquidity to successfully manufacture and distribute our VLN® cigarette within 90 days of MRTP authorization by the FDA, if granted in 2021.

We also have an effective S-3 shelf registration statement on file with the U.S. Securities and Exchange Commission (SEC), which provides us flexibility and optionality to raise capital, however there can be no assurance that capital will be available to us on acceptable terms or at all.

Critical Accounting Policies and Estimates

There have been no material changes to the information set forth in our Annual Report on Form 10-K for the year ended December 31, 2020.

Inflation

Inflation did not have a material effect on our operating results for the three months ended March 31, 2021 and 2020, respectively.

Off-Balance Sheet Arrangements

We do not have any off-balance sheet arrangements as defined by Item 303(a)(4) of Regulation S-K.

Item 4. Controls and Procedures

(a) Evaluation of Disclosure Controls and Procedures:

The Company maintains disclosure controls and procedures that are designed to ensure that information required to be disclosed in its Securities Exchange Act of 1934 (“Exchange Act”) reports are recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms, and that such information is accumulated and communicated to the Company’s management, including the Company’s chief executive officer and chief financial officer, as appropriate, to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

Our chief executive officer and chief financial officer, after evaluating the effectiveness of the Company’s “disclosure controls and procedures” (as defined in the Exchange Act Rules 13a-15(e) or 15d-15(e)) as of the end of the period covered by this quarterly report, have concluded that our disclosure controls and procedures were effective as of the end of the period covered by this

Form 10-Q to ensure information required to be disclosed is recorded, processed, summarized and reported within the time period specified by SEC rules, based on their evaluation of these controls and procedures as required by paragraph (b) of Exchange Act Rules 13a-15 or 15d-15.

(b) Changes in Internal Control over Financial Reporting:

There were no changes in the Company’s internal controls over financial reporting during the first quarter of 2021 that have materially affected, or are reasonably likely to materially affect, the Company’s internal controls over financial reporting.

Part II. OTHER INFORMATION

Item 1. Legal Proceedings

See Note 11 - Commitments and Contingencies – Litigation - to our consolidated financial statements included in this Quarterly Report for information concerning our on-going litigation. In addition to the lawsuits described in Note 11, from time to time we may be involved in claims arising in the ordinary course of business. To our knowledge other than the cases described in Note 11 to our consolidated financial statements, no material legal proceedings, governmental actions, investigations or claims are currently pending against us or involve us that, in the opinion of our management, could reasonably be expected to have a material adverse effect on our business and financial condition.

Item 1A. Risk Factors

There have been no material changes from the risk factors disclosed in Item 1A of Part I of our Annual Report on Form 10-K for the year ended December 31, 2020, as filed with the SEC on March 11, 2021.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds.

None

Item 3. Default Upon Senior Securities.

None

Item 4. Mine Safety Disclosures

None

Item 5. Other Information

None

Item 6. Exhibits

Exhibit 31.1	Section 302 Certification - Chief Executive Officer
Exhibit 31.2	Section 302 Certification - Chief Financial Officer
Exhibit 32.1	Certification of Principal Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. Section 1350 as adopted pursuant to section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document
Exhibit 104	Cover Page Interactive Data File - The cover page interactive data file does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized:

	22nd CENTURY GROUP, INC.
Date: May 6, 2021	/s/ James A. Mish James A. Mish Chief Executive Officer (Principal Executive Officer)
Date: May 6, 2021	/s/ John Franzino John Franzino Chief Financial Officer (Principal Accounting and Financial Officer)

Exhibit 31.1

CERTIFICATIONS

I, James A. Mish, Chief Executive Officer of 22nd CENTURY GROUP, INC., certify that:

1. I have reviewed this quarterly report on Form 10-Q of 22nd CENTURY GROUP, INC.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules13a-15(f) and 15d-15 (f)) for the registrant and have:

   a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of registrant's board of directors (or persons performing equivalent functions):

a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 6, 2021

/s/ James A. Mish
James A. Mish
Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATIONS

I, John Franzino, Chief Financial Officer of 22nd CENTURY GROUP, INC., certify that:

1. I have reviewed this quarterly report on Form 10-Q of 22nd CENTURY GROUP, INC.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules13a-15(f) and 15d-15 (f)) for the registrant and have:

a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of registrant's board of directors (or persons performing equivalent functions):

a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 6, 2021

/s/ John Franzino
John Franzino
Chief Financial Officer
(Principal Accounting and Financial Officer)

Exhibit 32.1

Written Statement of the Principal Executive Officer and Chief Financial Officer Pursuant to 18 U.S.C. §1350

Solely for the purposes of complying with 18 U.S.C. §1350, I, the undersigned Chief Executive Officer of 22nd CENTURY GROUP, INC. (the "Company"), and I, the undersigned Chief Financial Officer of the Company, hereby certify, to the best of my knowledge, that the quarterly report on Form 10-Q of the Company for the quarter ended March 31, 2021 (the "Report") fully complies with the requirements of Section 13(a) or Section 15(d) of the Securities Exchange Act of 1934 and that the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

This certification is being furnished solely to accompany this Report pursuant to 18 U.S.C. 1350, and is not being filed for purposes of Section 18 of the Securities Exchange Act of 1934 and is not to be incorporated by reference into any filing of the registrant, whether made before or after the date hereof, regardless of any general incorporation language in such filing.

Date: May 6, 2021

/s/ James A. Mish

James A. Mish
Chief Executive Officer

Date: May 6, 2021

/s/ John Franzino

John Franzino
Chief Financial Officer